THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

JULY, 1893.

ON THE PARASITIC NATURE OF CANCER.[1]

By Heneage Gibbes, M.D.,
PROFESSOR OF PATHOLOGY IN THE UNIVERSITY OF MICHIGAN.

In making an investigation into this subject it is necessary to take for comparison a condition where undoubted parasites produce changes in an organ or tissue which are equivalent to a new growth. For this purpose psorospermosis in the liver of the rabbit is generally admitted to be a typical condition, and a careful study of the changes found there, and the relation of the parasite to the newly formed tissue, should be fully determined in the first place, so that the process can be followed out in the cells of a growing carcinoma, where, from the arrangement of the tissues, this is infinitely more difficult.

On cutting into one of the small nodules found in the rabbit's liver, a substance can be expressed having a yellowish tint; this is found under the microscope to consist of large oval bodies, with others of smaller size varying in form, epithelium shed from the bile ducts, and leucocytes. On making sections through one of these nodules it is found to be composed of dilated bile ducts, the spaces in which are filled by masses of the material just described. The large oval bodies are seen, some free in the cavities, others wedged in between the epithelial cells lining them; the smaller, rounded forms occupy the same positions. It is evident that having proceeded so far, it is necessary to find some means by which these parasites in their various forms can be differentiated with absolute certainty from the cells of the bile ducts, for otherwise their relation to one another cannot possibly be determined.

[1] Read before the Association of American Physicians, at Washington, May, 1893.

This can only be done by double staining in such a manner that the parasites are colored distinctly from the cells of the part and their nuclei, and this staining must be uniform throughout the section and not in patches, and every section must stain alike.

After trying a large number of coloring agents, I have succeeded in producing a double stain which will fulfil these conditions.

It is made as follows: Dissolve 2 c.c. of aniline oil in 10 c.c. of cologne or rectified spirit, make up to 100 c.c. with distilled water, and filter. This makes practically a saturated solution. With this aniline water make a 2 per cent. solution of rosanilin sulphate for stain No. 1, and a 1 per cent. solution of iodine (not methyl) green for solution No. 2.

To use the stain, filter No. 1 into a watch-glass, and place in it some sections of rabbit's liver which have been hardened in alcohol, and leave them in for ten minutes. Remove, and wash them in water to remove superfluous stain, then wash slightly in ordinary alcohol and place them in a watch-glass of filtered No. 2. It is better not to time them in the second stain, but to take them out and examine in distilled water, and when the original red color has become changed to a dull purple the staining will have proceeded far enough. Then wash thoroughly in distilled water until all excess of color has been removed, then wash in ordinary alcohol until no more color comes away, clear in oil of cloves, and mount in xylol balsam. On examining a section prepared by the above method, it will be seen at once that there is no difficulty in differentiating the parasites from the tissues affected by them.

APPEARANCES PRESENTED BY THE PARASITES.

1. Large oval cells, each with a capsule stained slightly a dull red, having inside a mass of material which has been stained a brilliant red.

2. Shrunken, wrinkled capsules, some empty, some with a small mass of granular material in them, which, however, has not taken the bright red stain. A few of these empty capsules show a number of sharply defined black granules.

3. Large oval cells without a capsule, having a granular appearance, the whole stained slightly a dull reddish color. In addition to these are cells of the same character, but round in outline. These are probably the large oval cells in transverse section. These cells vary. Some show a coarse granulation amounting to a network, while in others the granulation is very minute. Some also show a small round nucleus. Their size also varies, but the smallest is many times larger than any single columnar cell lining the bile ducts.

APPEARANCES PRESENTED BY THE ALTERED TISSUES.

A section through the dilated bile ducts shows a number of spaces or cysts lined with columnar epithelium, and into these spaces project papil-

lomatous folds which branch and are also covered by columnar epithelium. These folds consist of fibrous trabeculæ, varying in thickness, having a homogeneous basement membrane on which the epithelium is situated. In the more delicate trabeculæ—that is, those most recently formed—the connective tissue is in process of development, and contains a large number of young connective-tissue corpuscles.

At the base of these folds this young connective tissue can be seen penetrating the liver substance and isolating the liver cells, so that in the substance of some of the folds one or more rows of liver cells are still left surrounded by connective tissue.

ACTION OF THE STAINS ON THE TISSUES.

The green stain has picked out all the nuclei by its action on the nuclear network, with the exception of the older connective-tissue corpuscles. By this stain the nuclei of the columnar cells covering the trabeculæ in folds are seen to be small, narrow, oval in shape, having a comparatively thick network; the nuclei of the liver cells at the base of the folds are much larger, round, or slightly oval, and have a finer network. The nuclei of the young connective-tissue corpuscles are of the usual character, and the leucocytes have taken the stain very deeply. These are the only elements stained by the green.

The fibrous tissue and protoplasm of the liver cells are stained a purplish red, and the protoplasm of the columnar cells has taken the same tinge, the color being darker in the liver cells than in the other two.

THE RELATION OF THE PARASITES TO THE ALTERED TISSUE.

Taking a section which has been cut as thin as possible, and in which the different elements have been differentiated as described above, we find, in the first place, a mass of parasites filling up the spaces between the folds, a number of them being a bright red, the others having only a faint tinge of dull red; amongst these are a number of desquamated columnar cells in various stages of disintegration; their nuclear network, however, is stained brightly with the green. There are also a number of deeply stained small round cells (green) which appear to be leucocytes. On examining the epithelium, we find wedged in between the cells a number of the parasites, some in the capsulated form a brilliant red, others a dull red, with no capsule. They are plainly wedged in between the cells, and reach down to the basement membrane. It is, however, a difficult matter to get at the exact relationship of one to the other in the section of the fully formed fold. But if we look for a small bile duct in which the process of dilatation is only just commencing, it becomes an easy matter to understand it. There are a number of small bile ducts to be found at the base of the folds which contain several parasites, and

in proportion to the number of these has the process of dilatation advanced. In the smallest a few parasites are seen, one or two adult forms, while there may be five or six that have not developed a capsule; the majority, however, are free in the lumen of the duct, a few are wedged in between the cells. In some ducts the process has gone further, and small folds are just beginning to form, and in these ducts the lumen is much larger and the parasites more numerous. The relation of the parasites is, however, very plain, and by using a binocular microscope with a high power it can be ascertained beyond a doubt; the parasites that are wedged in between the columnar cells by their growth and presence cause desquamation and disintegration of contiguous cells, but in no case are they contained in the columnar cells. This would be a physical impossibility, as the smallest forms of the parasites are much larger than the columnar cells. It is, of course, possible for the parasite, in an early stage of its growth, to get inside a cell and expand it as it grows. I cannot, however, find any parasite small enough to do this, neither do any of the columnar cells show evidence of any displacement of their nuclei, which must take place if another body was growing inside them.

On examining some of the large cells that have no capsule, a few will be found which have had a portion cut off in making the section. These cells show a margin of granules, while the centre is free from them. This shows that the granules are on the outer margin of the cells, and the binocular microscope confirms this view. We have, then, a large oval cell having a granular covering. On examining a number of these, it is at once apparent that this granular covering varies very much in different cells. In some it is very fine and difficult to make out, having scarcely any appreciable thickness, in others the granules are much larger and the coating is thicker. Further examination shows that this granular covering increases in thickness and in the size of its elements until definite patches are seen covering the cell. In some this change has gone on until the cell is almost covered; this is the development of the capsule, and the appearances described might easily be considered as the expansion of one cell by the growth of another inside it. All these stages in the development of the capsule can be seen going on in the spaces of the dilated bile ducts. It seems to me that this explains the view held by some that the parasite inhabits the cells of the bile ducts. If we consider the enormous number of parasites that are found free in the spaces of the dilated bile ducts, and the very small number that are found wedged in between the cells, also that every stage in development is going on in those lying free, and also take into consideration the fact that the smallest form of the parasite that we can detect is very much larger than the columnar cell of the bile duct, it seems to me that we must accept as a fact that the action of the parasites is simply one of chronic irritation caused by their rapid multiplication in the lumen of

these vessels. This is a very important consideration, as we do not know how far, in many cases, new growths are produced simply by chronic irritation. I have seen several cases where horny growths which had existed for many years were converted into epitheliomata by the action of irritants. In another case, where lycopodium had been used as a dressing, I found the seeds deeply imbedded in a new growth. They may, of course, have had nothing to do with the formation of the neoplasm. But in a case of villous growth in the bladder removed by Sir Henry Thompson, I found a wheat-straw imbedded in its centre. In this case I have no doubt the new growth was caused by the foreign body.

The next question to be considered is the cancer parasite and its relation to the cancer cell. On reading the recent literature on this subject, the first thing that strikes one is the diversity of opinion that exists as to the appearances presented by the parasite and its frequency, some observers finding it in every case in such numbers that it could be estimated by weight, while others found it in only about 4 per cent. of the cases examined. From the illustrations given, it would seem that all the observers were not looking at the same object. Some give special methods of hardening the tissue, while others found the parasite in material hardened in the usual manner. To test the value of these special methods, and find out what their action would be on tissues, I hardened portions of a fresh cancer by the methods used in my laboratory, and also by bichloride of mercury, osmic acid and Müller's fluid, and some other methods described by different observers; at the same time I hardened portions of normal ox liver by all these processes. Sections were made of all the material and stained with logwood, and also with the special stain I have already described. The sections of cancer and liver hardened in the usual manner showed the normal liver as it is known to be, while there was nothing to be seen in the sections of cancer which could be considered parasitic; but in the sections hardened in bichloride of mercury and in osmic acid and Müller's fluid, both liver and cancer were so much altered by the hardening process that it was not difficult to realize how the characteristic organism of cancer could be found and estimated by weight. Those observers, however, who have only found the so-called parasite in a small percentage of the cases examined, have not been describing effects produced by bad hardening; the appearances they have figured I have long been familiar with. They are, I think, capable of a different explanation than that given. I have gone over the large collection of cancer specimens I have made in the last fourteen years, and I find these appearances in only a few of them. In 1879, while working at karyokinesis, I obtained a specimen of cancer in the fresh condition, which, after hardening, showed in the section a number of very large cells. In these I found mitotic division most beautifully shown, but the process was going on inside the large cell; the original

cell was enormously enlarged, its nucleus and some of its protoplasm pushed to one side, while in the centre was a small mass of protoplasm containing a nucleus. This nucleus, in various cells, showed all the stages of mitotic division, from the simple aster to two fully formed nuclei. I considered this to be a typical example of the endogenous division of cells. In 1886 I photographed this specimen amongst a number of others, showing various conditions in cancer development, and in 1891 I used this as an illustration of endogenous division in my work on *Practical Pathology and Morbid Histology*. I have only a few cases in which this process appears.

For the purpose of studying the parasitic nature of cancer I have used cases where the development of the cells can be observed, such as in the axillary glands, where the process is secondary to carcinoma mammæ, and where the operation was performed in an early stage of the disease, and also in cases where recurrence had taken place and the growth had been removed twice or three times. In recurrent cancer of the breast small nodules are found in the muscles, and their development and relation to the muscular tissue is very interesting. Examining that portion of a section which shows the cancer cells invading the muscles, changes in the muscular fibres which are at some little distance from the cancer cells are at once apparent. Some of the fibres show spaces in their substance somewhat similar to the appearances found in striped muscle in cases of myxœdema; in others, the muscle substance is completely broken up and the muscle corpuscle is seen as a shrunken nucleus surrounded by an empty space. All these changes take place before a single cancer cell is in apposition with the muscle fibre.

The next change is the appearance of one or two cancer cells in the centre of the broken-down muscle fibre. These increase until the fibre is replaced by cancer cells and the sarcolemma is either changed into fibrous tissue or is replaced by it. The method by which the cancer cells gain access to the centre of the muscle fibre is not apparent, and requires further investigation. In all these cases active growth of the cancer elements can be accurately observed, and I hold that where a pathological process is in an active stage of development, there the cause, if capable of demonstration, should be found. I considered that in these cases I ought to find the parasite, if the disease process were caused by one. The most careful examination of a number of cases has failed to show anything that could be construed into any form of parasite —that is, in those sections hardened by a method which gave normal appearances in sections of normal liver.

When we consider the many different forms of cancer, it does not seem possible that they can be the result of the action of any one form of parasite; and, further, when we study the differences between two forms, such as squamous epithelioma and glandular carcinoma, we find

the differences so marked that, although they have certain points in common, yet they are practically different diseases. In squamous epithelioma we have a condition in which the epithelium receives some impetus at a certain point which causes it to grow downward into the tissue below, and there to branch out in every direction. It is at the one point, however, that the growth takes place, and the newly formed epithelial tissue will grow sideways under the normal epidermis without having any effect on it. It has also no effect upon the fibrous connective tissue into which it grows, as a rule. I have, however, seen an enormous hyperplasia of yellow elastic tissue produced by the growth of an epithelioma in the eyelid.

On the other hand, we have a glandular carcinoma, starting in secretory epithelium, and consisting of cells derived from this epithelium, and in every case this new growth affects the fibrous connective tissue in such a manner that a supporting framework is formed for it as it grows, and in this are contained new bloodvessels for its nourishment. Although these two forms differ so much in their construction, there is one point of absolute resemblance between them. A cell from either form, on being carried to a distant organ, will at once reproduce a cancer of the same type as that from which it started. It therefore follows that if a parasite is required, it must be the cell itself; but that gives no explanation as to how the first cancer cell became cancerous.

Sarcoma must be considered on an entirely different basis. Where I have been enabled to examine a sarcoma in its earliest condition, that is, where a young growth is starting in connection with an established sarcomatous condition, I have found that it always consisted of embryonic connective tissue, and, according to my observations, all mesoblastic neoplasms begin in this way. Whether they receive the impetus which decides that they are to become sarcomata or to remain benign at the commencement or later in their growth, would seem to vary in different cases.

Conclusions.—1. The dilatation of the bile ducts in the liver of the rabbit is caused by the chronic irritation produced by the multiplication of the coccidium oviforme (Leuckart) in them, and the appearances which have given rise to the view that these parasites are developed in the columnar cells of the bile ducts are caused by the different stages in the development of the capsule.

2. The appearances found in a small percentage of glandular carcinomata are caused by endogenous cell-formation; the large majority of glandular carcinoma show nothing which can be considered parasitic when hardened by any method which, when applied to normal tissue, will give a typical normal section.

THE INTESTINAL ORIGIN OF CHLOROSIS.[1]

By F. Forchheimer, M.D.,
of Cincinnati.

The object of this paper is to show that chlorosis is produced by changes that take place primarily in the small intestine. Sir Andrew Clark, in an excellent paper on "The Anæmia and Chlorosis of Girls, occurring more commonly between the Advent of Menstruation and the Consummation of Womanhood" (*Lancet*, November 19, 1887), and indirectly Bunge, Landwehr, and Kobert (*St. Petersburger med. Wochenschrift*, 1891), have called attention to the connection between intestinal processes and chlorosis, so that the fact has been admitted that such connection exists. The following may go to show how chlorosis originates in the intestine.

The characteristic blood condition of chlorosis is oligochromæmia—a diminution of hæmoglobin for each red corpuscle without even approximately great diminution in the number of red corpuscles. It is unnecessary to add that a clinical diagnosis could not be established from blood examination alone; that oligochromæmia occurs as a physiological condition, or that some individuals, apparently in the best of health, are oligochromæmic. Accordingly, oligochromæmia would bear the same relation to chlorosis that glycosuria does to diabetes mellitus.

A diminution in hæmoglobin can occur from two causes only: either the destruction of hæmoglobin becomes abnormally great or the formation becomes abnormally small. As far as we know, destruction of hæmoglobin is always associated with destruction of the red corpuscle; our definition of chlorosis, then, would preclude the possibility of this disease being due to destruction of hæmoglobin. But let us admit that a separate destruction of hæmoglobin and red corpuscle can exist—a condition hinted at by many authors; it will then become necessary to prove that, commonly, at least, this does not occur in chlorosis.

The formation of the stroma and the hæmoglobin of the red corpuscle consists of two distinct acts, as is proven by their first appearance in the mesoblast during fœtal life, and in extra-uterine life by the behavior of the erythroblasts of Bizzozero. We have first the stroma and then the coloring matter, and, therefore, it is not unreasonable to suppose that normal (numerically) cell-formation might go on with diminished hæmoglobin-production (chlorosis) or normal hæmoglobin-formation with diminished corpuscular production, either process causing a diseased condition.

[1] Read before the Association of American Physicians, Washington, D. C., June 1, 1893.

That there is no appreciable destruction of hæmoglobin in chlorosis can be proven by an examination of the urine in all cases in which the hæmoglobin sinks to 60 per cent. or below (Fleischl's hæmometer). My attention was first called to this fact by a routine urinalysis in the case of a Russian girl, when the so-called urophaein test of Heller was followed by a negative reaction. In this girl, a characteristic imported case of chlorosis with hæmoglobin 40 per cent. and red corpuscles 3,975,000, the urine was found as usually described—"copious, pale, acid, of low density, somewhat deficient in urea, and always prone to speedy decomposition" (Clark). As the urophaein test is supposed to be produced by all the coloring matters of the urine except the urine-indican, it became necessary to determine whether urobilin was present or not. A chloroform extract treated with iodine and dilute potassium hydrate gave no fluorescence (Gerhardt's test), and, practically, no green color, so that, when this examination had been repeatedly made, the conclusion could not but be formed that urobilin was practically absent. As urobilin is one of the end-products of bilirubin, and the quantity of bilirubin depends upon the destruction of the red corpuscles or their hæmoglobin, it would seem to follow either that there is failure of absorption of hydro-bilirubin from the intestine or lack of formation. There is no diminution in the absorptive function of the small intestine, so that there must be less hæmoglobin destroyed than normal. The fact must be mentioned that in chlorosis of less degree there is not always an absence of urobilin; this can be explained by taking into consideration the quantity of hæmoglobin; with the destruction of an equal number of red corpuscles it is sufficient at times to produce the urobilin reaction, but not always. The statement can be made, then, that chlorosis is not due to hæmolysis, either of corpuscles or of hæmoglobin, but must be due to faulty hæmopoiesis, as far as hæmoglobin is concerned, and, possibly in severe cases, secondarily even as to red corpuscles.

Little has been done on the origin of hæmoglobin. It has been known for some time that after a full meal the amount of hæmoglobin sinks, but this can be satisfactorily explained by the dilution of blood due to absorption of fluid. From an experimental therapeutic standpoint, much has been done; but the results are so variable that they may be called inconclusive. It would seem a simple matter to prove or disprove the absorption of iron or iron-containing albumins from the intestine, yet, with the technical difficulties and the incomplete establishment of physiological data, this has not been the case. So that it became necessary to make a series of experiments which had reference to hæmoglobin only. In these the question of iron absorption or excretion, or the conversion of hæmoglobin, could be abstracted from entirely; and direct, comparative observations of hæmoglobin could be made. The object of

the first series was to determine whether hæmoglobin was formed in the intestine, having previously had conclusive evidence that hæmoglobin-formation could be increased by the introduction of certain substances not containing iron into the intestine of patients. Rabbits were chosen for the observations, purely for the purpose of convenience; during full intestinal digestion they were put upon the rabbit-holder, the abdominal cavity was opened, and blood was examined from the terminal branch of the mesenteric artery and its accompanying beginning of the mesenteric vein. Care was taken to open the bloodvessels as near as possible to the entrance or exit, so that arterial blood was examined immediately before it went into the capillaries of the intestine, and venous blood directly it came from them. As the result of forty observations, the average is as follows:

In the artery: Red corpuscles, 5,362,000; hæmoglobin, 78¾ per cent.

In the vein: Red corpuscles, 4,540,000; hæmoglobin, 78¾ per cent.

From which we deduce as follows: The number of red corpuscles is diminished in the veins, while the quantity of hæmoglobin remains the same; therefore hæmoglobin is absolutely increased in the vein and each red corpuscle carries more hæmoglobin in the vein than in the artery. The dilution of venous blood during digestion must be taken into consideration; this would, probably, also account for the diminution of red corpuscles. If the blood contains 78¾ per cent. hæmoglobin before going through the capillary circulation, takes up fluid there, and comes into the veins containing 78¾ per cent., it certainly follows that hæmoglobin is increased in the vein. As a result of calculation it will be seen that each red corpuscle carries about 18 per cent. more of hæmoglobin in the vein than in the artery. The only other explanation, that the quantity of hæmoglobin remains stationary in the arteries and veins, can, therefore, be rejected.

From this observation the conclusion can be drawn that, in the rabbit, hæmoglobin is taken up by the blood from the intestine, and that it must be formed either in the parts supplied by the arteries—*i. e.*, the mucous membrane in its broadest sense—or within the lumen of the intestinal canal. It does not seem to be going too far to extend this view to the human being when corroborated by other testimony.

It has been stated that the quantity of hæmoglobin is diminished after a full meal, but, to my knowledge, no investigation has been made as to the influence of intestinal digestion upon hæmoglobin-formation. It was necessary, therefore, to examine the blood at this time in order to determine whether the view expressed before could apply to the human being. Fifteen adults whose histories were known were examined in the following way: the blood was examined before they sat down to the heaviest meal of the day and from three to four hours afterward, with the following average result as to red corpuscles and hæmoglobin. In

all cases but one there was a decided increase in the number of red corpuscles and in hæmoglobin. Before the meal hæmoglobin was present as 86 + per cent., and red corpuscles as 4,905,000; after the meal hæmoglobin 89 per cent. and red corpuscles 5,044,000—so that there was an absolute increase of hæmoglobin of nearly 3 per cent., and a slight increase in hæmoglobin for each red corpuscle after the meal (represented by the fraction $\frac{2861}{4,905,000 \times 5,044,000}$). It will be seen, then, that a large quantity of hæmoglobin is added to the circulation during intestinal digestion, and that the number of red corpuscles is increased, so that, although the simple experiment of the rabbit cannot be carried out upon the human being, its results can be fully applied to the latter.

A very practical result of these examinations is that, for comparative observations upon the same individual, the examination must always be made at the same time of the day and in approximately the same relation to a meal. This has been done in all the examinations to be reported upon further on.

It now having become apparent that hæmoglobin was formed in the intestine, and that the lack of formation could be looked upon as the cause of chlorosis, it seemed feasible to attempt a solution of the problem why hæmoglobin was not formed in sufficient quantity in this disease. Two ways were open: first, by means of therapeutic attempts; and, secondly, by direct investigation; the former the easier of the two, but to be referred to later.

Three litres of urine, with the following general characteristics, were taken from a chlorotic patient: acid reaction, sp. gr. 1012, pale color, indican increased, urophaein diminished, urobilin test negative, no albumin, no sugar. After having been filtered there was added three times the quantity of alcohol, drop by drop, which was followed by the production of a flocculent, not very copious precipitate; this was then put through a filter. The process of filtration was very slow, taking fully forty-eight hours, and when the attempt was made to re-dissolve the precipitate in distilled water, it was found impossible to do so. The substance was then obtained by drying upon the filter. In order to find out whether it had toxic properties, a small quantity was rubbed up in water and injected into the subcutaneous tissue of a rabbit. In small doses it produced elevation of temperature, apathy, loss of appetite, and loss of muscular power; in large doses, the following symptoms were noticed, the rabbits dying about eleven hours after injection: First, about three-quarters of an hour after the injection, rapid elevation of temperature (103½°), and, with this, loss of motion. About an hour after the injection, temperature begins to fall until, just before death, it falls to 91° F. After two hours the animal becomes absolutely motionless, reacting only upon strong stimuli, to be followed by convulsive movements. The

post-mortem examination reveals no evidence of inflammation; the internal organs seem normal with the exception of the lungs and kidneys, both being very much congested. The veins and the arteries contain fluid blood and there is no evidence of clotting anywhere, except in the heart.

The toxicity of this substance being established, an attempt was now made to determine its nature, especially in view of the fact that normal urine is supposed to contain a toxic body (urotoxin). That it is an albumin was proven by the biuret, Millon's, and xanthoprotein tests. Peptones and albumoses (except hetero-albumoses) were excluded on account of insolubility in water. The toxalbumins could be excluded on account of dissimilarity of animal reaction. The body is soluble in NaCl and precipitated by saturation, it is precipitated by $(H_4N)_2SO_4$, it is precipitated, like globulin, by CO_2, so that, in all probability, we are dealing with a double body, a proteose, of toxic properties, the exact nature of which will have to be determined by further investigation.

As to its origin, the statement can be made with a certain amount of certainty: it is an intermediate product between albumin and peptone, which is produced either by putrefaction or digestion in the small intestine, possibly both. It is not improbable that this body is the result of a process which destroys the albumin part of the molecule of the precursor of hæmoglobin. What form this is in, it is too early to determine, although Bunge's hæmatogen-organic iron found in the yelk of eggs is claimed by the discoverer to be destroyed in the intestine by H_2S, just as we imagine the precursor of hæmoglobin to be destroyed in the intestine of chlorotic patients by some active body, either some lower form of life or some enzyme, the result being the poisonous body in the circulation, and prevention of hæmoglobin-formation.

Lastly, I wish to present briefly, the therapeutic evidences I have gathered. Sir Andrew Clark states in his paper that "If in the treatment of this malady I were perforce limited to the employment of one sort of drug, the drug which I should choose for use would be an aperient." In the eleven cases from which I shall draw my conclusions I have used neither iron nor aperients, but have given salol or hydronaphthol (so called). It will be readily understood why the number of cases is so small when the statement is made that chlorosis of high grade is not very common with us, and that all the cases which I have seen have not been exclusively treated by these drugs. The object of the method was to introduce some substance into the small intestine, so as to prevent abnormal decomposition, and none better suggested themselves than salol, with its salicylic acid, at first, and latterly hydro-naphthol. In order to make the therapeutic tests as pure as possible, no laxatives were administered, but the bowels were emptied by means of agents acting upon the large intestine only (enemata, flushing the large intestine, or glycerin, either as an injection or suppository). The eleven

cases were all females, varying in age from fifteen to thirty-five years; menstrual difficulties were present in seven cases—the most pronounced case claiming to be regular in every respect; constipation was present in six cases, stomach trouble in four. In all the cases the urine presented the chemical characteristics mentioned before. Two of the cases were chronic chlorosis, one of which was cured after a long siege, the other one presenting relapses, so that she cannot be reported as cured. The quantity of hæmoglobin varied at the beginning from 40 to 70 per cent., and the number of red corpuscles from 3,766,000 to about the normal for women. Six of the cases were treated with salol, five with hydro-naphthol, and one with both. The patients were kept under treatment until hæmoglobin reached 90 per cent. or over, and the time of treatment varied from five weeks, as the shortest, to three years in the one case. All precautions were taken to establish accuracy in blood examination (counting a sufficient number of squares in the hæmocytometer, the arrangement of the light for the hæmometer, examination at the same time of day, and with reference to meals, etc.). The results, expressed in general terms, were steady increase in hæmoglobin, interrupted by regular diminution as the result of menstruation and several other causes. When a gain was made, the smallest amount gained in one week was 5 per cent., the greatest 20 per cent. In one patient, the only exception, it took two weeks before the remedy (salol) produced any effect, but in two weeks after that the hæmoglobin had risen from 65 per cent. to 85 per cent. With the rise in hæmoglobin all the patients began to improve; the nearer 80 per cent. the more the symptoms began to disappear, and, from ordinary examination, without blood test, most of the patients would have been willing at this point to have been discharged as cured. In the obstinate chronic case referred to above, the hæmoglobin was just as surely increased as in the others, but as soon as treatment was stopped the hæmoglobin would again sink, so that, after the end of two or three months, the patient would present herself again with hæmoglobin 55 or 60 per cent. In no way, however, could she be looked upon as disproving the effects of these two remedies upon hæmoglobin-formation. Hydro-naphthol seemed, upon the whole, more efficacious than salol, the results being more quickly obtained and the rise being more rapid. If any deduction could be drawn from the different action of the drugs, it would be that salol acts both upon lower forms of life and upon enzymes, while hydro-naphthol probably acts only upon the former. However this may be, both act by causing increase of hæmoglobin, the salol acting, in addition, especially in the direction of producing a decided increase in the number of red corpuscles.

In conclusion it may be stated that, possibly, some other origin for hæmoglobin may exist than in the intestine; from all evidences, however, this is the principal source and in chlorosis the most important.

A CASE OF SUB-CORTICAL CYST OF THE LOWER PART OF THE LEFT ASCENDING PARIETAL CONVOLUTION; OPERATION; RECOVERY.[1]

By Theodore Diller, M.D.,
VISITING PHYSICIAN TO THE INSANE DEPARTMENT OF ST. FRANCIS HOSPITAL, PITTSBURG,

AND

J. J. Buchanan, M.D.,
SURGEON TO MERCY HOSPITAL, PITTSBURG.

The case about to be described is of considerable interest in view of the many and great difficulties which beset the localization of, and operations upon, intra-cranial growths. It confirms, as much as a single case can, the generally accepted ideas concerning the localization of certain motor functions in the Rolandic region. It lends support to the opinion (upon which there is not so much unanimity) that there is no cortical representation of sensation in the pre-central convolution, and also offers distinct negative evidence in support of the view that this convolution is not related to the function of muscular sense. The hypothesis of Seguin,[2] Mills,[3] and others, that when hemiparesis precedes spasm the lesion is sub-cortical, is confirmed by the evidence presented by our case.

From the surgical aspect of the case, the admirable control of hemorrhage during the operation by means of a rubber band around the head is worthy of mention. Other points will be mentioned by Dr. Buchanan in his account of the operation.

Dr. J. B. Murdoch saw the case in consultation with us at the Mercy Hospital in the latter part of July, 1892, when we all agreed upon the diagnosis of an intra-cranial lesion situated in the middle or lower third of the left Rolandic region; and we further agreed upon the propriety of an operation provided anti-syphilitic treatment should prove of no avail.

HISTORY OF CASE AND ACCOUNT OF EXAMINATION OF PATIENT, WITH REMARKS BY DR. DILLER.

J. P., admitted to the Mercy Hospital July 17, 1892. Native of Scotland; aged thirty-five years; single; has always worked as a coal-miner. Uses alcohol moderately. Denies specific infection. Always enjoyed good health up to beginning of present illness. Family history good; no tubercular taint.

He was in good health and working regularly in the mines up to

[1] Paper read before the meeting of the American Medical Association at Milwaukee, June 6, 1893.

[2] Amer. Journ. Med. Sciences, July, August, and September, 1888.

[3] Cerebral Localization.

June 1, 1892. He has been injured several times by coal falling on his head, but not recently, and never severely. The first departure from health he noticed was a "failure of voice." He states that he could not utter certain words, although he could think of them. Soon afterward, he began to lose some power over the muscles of the right side of the face. This paresis increased. Slight paresis of right hand ensued about June 21st (three weeks after appearance of first symptom). Two weeks later he became aware of some loss of power in right leg, the paresis in arm and face having increased in the meanwhile. In the latter part of June he was seized with spells of vomiting which came on both before and after eating. He was troubled with this symptom for about three weeks. In the early part of July he began to be troubled with headache in the left frontal region and extending back to the parietal region on the same side. It came in increasing paroxysms for about a week, during which time it was so severe that he was kept awake much of the time at night. At the end of a week these head-pains began to decrease in frequency and severity, so that four weeks after their onset they had almost disappeared and he could sleep eight hours out of the twenty-four. He suffered from some vertigo in connection with these headaches.

In the early part of July, after paresis of right face, arm, and leg had appeared, he was seized with a convulsion for the first time, which he describes as follows: He was in bed, sleeping, when he was awakened by spasmodic movements in the muscles of the right face and hand, but cannot tell which was first affected. The convulsion was confined to these parts and lasted six minutes. He was entirely conscious throughout the attack.

The second convulsion occurred about July 25th, in the daytime, while he was resting in bed, although not asleep. It involved the parts in the following order: right face and arm, then, shortly afterward, right leg. He was conscious throughout the attack, as well as before and after it. He does not remember the order in which the convulsion ceased.

August 1. Had a third convulsion, which was confined to the hand and forearm; not as violent as the first two.

12*th*. Had a fourth convulsion confined exclusively to right leg.

15*th*. Fifth convulsion took place. He was warned of its approach by slight twitchings of muscles on affected side. Attack began in right hand and slowly ascended the arm to the shoulder. Spasm continued in arm alone for one-half to one minute before any other parts were involved. Then right leg and face became involved (does not remember which first). Spasm of leg began in toes and involved successive groups of muscles upward to the thigh. The attack lasted three and a half minutes. Spasm in leg stopped last.

The paresis of right face, arm, and leg, as well as the aphasia, had progressively increased from the time the patient entered the hospital up to the day of the operation, although he had been during this time (about a month) taking large doses of iodide of potassium.

With the assistance of Dr. Buckner, the hospital interne, I carefully examined the patient on August 6th and again on August 15th. The result of these two examinations together will show the condition of the man just prior to the operation. I will speak of these examinations as his.

Status præsens. Male; height, 5 ft. 10 in.; weight, 155 lbs.; well proportioned.

Inspection of scalp reveals presence of scar one-third of an inch long situated a little below and behind the parietal eminence of the left side. Two other quite small scars are noted: one in the median line, three inches behind the coronal suture; the other, one and three-quarters inches to the left of this one. A fourth scar is noted in the parietal region, two and a half to three inches to the left of the median line. This scar is two-thirds of an inch long, horizontal in axis, its posterior extremity ending on a line which marks the Rolandic fissure. Below and above this scar, but principally below it, there is an area of slight depression about as large as a silver quarter-dollar piece.

Motor functions. Distinct paresis of the right arm and hand. Can with great difficulty and only partially raise the forearm upon the arm.

Very marked paralysis of muscles about the shoulder. Able to flex fingers or wrist only very slightly. Power to pronate and supinate arm much impaired. On the whole, the muscles of hand and forearm are much more involved than those of shoulder and upper arm.

Face distinctly drawn to left side; right naso-labial fold almost obliterated. Cannot pucker lips sufficiently to whistle.

Tongue is readily protruded and moved in all directions.

Eyes move readily in all directions; no apparent extra-ocular paresis.

Considerable impairment of power in muscles of right leg, but not nearly so marked as in muscles of right arm. He drags foot on floor in walking, but can distinctly improve his gait by a conscious effort. Can walk nearly as well with eyes closed as when open.

Sensation. He can feel touch of finger or pin at any point on the paretic side. A slight pin-jag causes pain.

Tested with æsthesiometer, he is able to recognize two points two to three inches apart on the inner and outer sides of the right forearm and from one and a half to two inches apart on right palm.

With eyes closed he can promptly distinguish between hot and cold cloths applied to the paretic parts.

Muscular sense. With eyes closed he recognizes a watch, bottle, pencil, or book placed in his hand if assisted in closing his fingers over the object. He can discriminate between several weights and can describe any position in which his affected arm or leg is placed.

Speech. He is frequently at a loss for a word. Says he can think of all words he wishes to express, but cannot always utter the word he has in his mind. Often by an extra effort he can utter words which at first trial he could not utter.

In reading a paragraph from a newspaper he hesitated several times at words and then, after an effort, pronounced them; two or three times dropped words. Says that occasionally a word fails to convey a meaning to his mind (possibly word-blindness). Reads better than he talks.

He understands all the words used in ordinary conversation (absence of word-deafness).

He showed himself able to appreciate the nature and use of a number of objects presented to him (absence of soul-blindness).

Mental condition. There is no evidence of mental deficiency or aberration. Memory, perception, and judgment good.

During three days intervening between the time of the completion of my examination of the patient and the day of the operation, the paresis

in the right arm and hand and the aphasia had quite perceptibly increased. Paresis in fingers had become absolute paralysis.

Eyes were examined by Dr. W. F. Robeson, just before the operation, who submitted the following report:

O. D.—Vn. = 20/xx partly. Jr. 0.06 (10 — 60 cm.)
O. S.—Vn. = 20/xx partly. Jr. 0.06 (10 — 60 cm.)

O. D.—Media clear. Nerve round, with scleral ring all around. No choroidal ring. Nerve slightly elevated and vessels large and numerous. Retinal circulation hyperæmic.

O. S.—Media clear. Nerve round, with scleral ring. No choroidal ring or crescent. Vessels full and numerous. Nerve elevated. Retinal circulation hyperæmic.

October 22, 1893 (after the operation), by Dr. F. H. Edsall:

O. D.—Vn. = 20/xx }
O. S.—Vn. = 20/xx } with difficulty.

O. D.—Media clear. Retinal circulation markedly congested. Optic disk very red and hyperæmic, and somewhat raised above the retinal plane. Disturbance shows no special point of interest.

O. S.—Media clear. Retinal circulation markedly congested. Optic disk very red and hyperæmic and somewhat raised above the retinal plane. Disturbance shows no special point of interest.

As before stated, it had been decided to operate in case a course of anti-syphilitic treatment should effect no favorable change. He was placed upon iodide of potassium upon entering the hospital, the dose being several times increased. After a course of four weeks' treatment, during which the symptoms had increased in gravity, we concluded that the disease was not amenable to specific treatment, and it was decided to operate at an early day.

Nearly all the important symptoms of intra-cranial growth were present, viz.: Headache, vomiting, vertigo, convulsions, and paresis.

The important sign of choked disk was not present, but the eye-grounds presented suspicious appearances which were strongly suggestive of the advent of this condition.

But enough symptoms were present to render the diagnosis of intra-cranial growth certain. A brief analytical review of the symptoms from the standpoint of the localizationist may not be amiss.

It is to be noted that aphasia was the first symptom which appeared; paresis of right face next appeared; then paresis of right arm; and then paresis of right leg; after these symptoms had appeared the patient suffered from his first convulsion, which was confined to the right face and arm and lasted six minutes. The second convulsion involved right face and arm and, subsequently, the leg. The third convulsion involved right hand and forearm only. The fourth convulsion was confined to the right leg. The fifth began in the right hand and then spread to the right arm, leg, and face.

The following table will show at a glance the order of invasion and the parts involved in each convulsion:

Convulsions.	Parts first involved.	Parts subsequently involved.
First	Right face and arm.	None.
Second	" " " "	Leg.
Third	" hand and forearm.	None.
Fourth	" leg.	"
Fifth	" hand and arm.	Leg and face.

It will be observed that in four of the five convulsions, the arm was involved first, either alone or with the face; that twice the face with the arm was involved first; that twice the right hand and arm alone were first involved. In only one convulsion was the hand or arm not involved at all. In two the face was not involved.

It will thus be seen that the signal symptom arose in the arm, this member being most frequently involved. This pointed to the arm centre as the seat of the greatest irritation; and as in the one convulsion the spasm was confined to the hand and arm alone, and in another clearly began in the hand, it was reasonable to suppose that the subdivision of the arm centres which is related to movements of the forearm and hand, especially the latter, was most involved.

Turning now from the symptom of convulsion to that of paresis, it has been seen that the right face, arm, and leg were involved. But the arm was distinctly more paretic than either the face or leg. Taking the arm alone, the hand was most affected, the forearm next, and the arm proper and shoulder least.

Motor aphasia was a prominent symptom. But the symptoms referable to the face and arm were much more marked than the aphasia, especially those referable to the arm.

Headache was more or less localized over the anterior half of the left side of the cranium. The largest scar noted was situated over the hand or face centre.

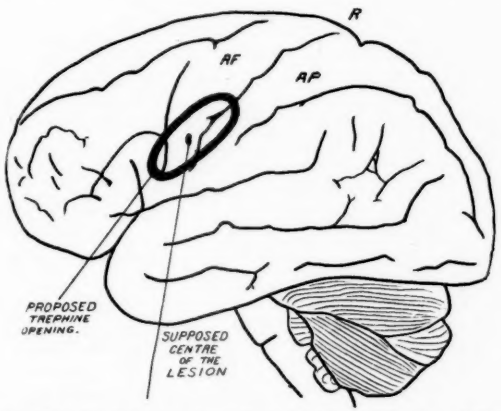
The foregoing considerations made it seem likely that a lesion was located in the left Rolandic region, involving principally the hand centre, but by continuity or pressure involving in an upward direction the other subdivisions of the arm centre as far as those for the shoulder and the subjacent areas below, viz., the centres for the right face and for speech.

Two other signs remained to be interpreted, viz.: (1) the appearance of paresis in one part after another before the first convulsion appeared; and (2) the absence of sensory disturbance of all kinds, including muscular sense. From the fact that paresis preceded convulsions, I regarded the lesion as probably a sub-cortical one. In view of the probable

fact that in the post-central convolution, the motor and sensory areas overlap, I regarded the absence of sensory symptoms as an indication that the lesion was situated anterior to the Rolandic fissure.

It was therefore determined to make an opening in the skull, the centre of which should correspond to the hand centre. It was thought best, both for exploratory and surgical reasons, to make two trephine holes with a large instrument so that the entire opening would be about 2½ inches long and 1¼–1½ inches wide. We designed to make this opening in a downward and forward direction at a little greater angle than the Rolandic fissure. It was intended that the centre of it should be a little anterior to the Rolandic fissure over the hand centre just above the imaginary horizontal line which divides the arm from the face centre.

The accompanying diagram will in a rude way show the proposed opening in the skull. I am inclined to believe, however, that by a slight



Af. Ascending frontal. *Ap.* Ascending parietal. *R.* Fissure of Rolando.

error in calculation, the actual opening was made about half an inch higher than indicated in the diagram.

OPERATION BY DR. BUCHANAN.

When this patient was admitted to the Mercy Hospital he was first examined by two of the resident physicians, Drs. Gibson and Buckner, who made a diagnosis of morbid growth in the left motor area. He was treated in the medical ward by my colleague, Dr. Moyer, by whom he was later transferred to me as a case suitable for surgical treatment.

The symptoms pointing clearly to a lesion at the middle or lower part of the fissure of Rolando, it became necessary to locate this fissure. I have been led to consider the relative method of Thane the best for this

purpose. This is to locate the upper end of the fissure of Rolando at a point 55.7 per cent. of the distance from the glabella to the inion and to extend a line downward and forward from this, at an angle of 67°, for a distance of 3⅜ inches. In passing, attention may be called to the ready method of laying off this angle as proposed by Mr. John Chiene, of Edinburgh. This consists in folding a circular paper having a radius of 3⅜ inches, first into quarters, then into eighths, and then into sixteenths, and taking the angle formed by $\frac{3}{16}$ of the circle. This furnishes the segment of a circle which measures 67.5°, and which gives practically the same result as an angle of 67°. This convenient method of fixing the angle I had accidentally discovered and used before seeing it mentioned in the *American Text-book of Surgery*, edited by Professors Keen and White. The only instrument, therefore, necessary to locate this important fissure is a tape-line, and the only number to be remembered is the proportional distance from the glabella to the inion. For greater convenience I have had a thin sheet of aluminium cut in the form of a segment of a circle, having an angle of 67° and a radius of 3⅜ inches, and moulded to fit the average skull when its straight sides are applied respectively to the median line and to the part of the scalp corresponding to the fissure of Rolando.

The day prior to the operation, the patient's scalp was shaved and well scrubbed with soapsuds and sublimate solution. The median line and the fissure of Rolando were laid off by the method above indicated with light strokes of the solid stick of silver nitrate. An antiseptic dressing was applied and kept in place till the time of operation. The usual antiseptic precautions were observed. A hypodermatic injection of morphine was given shortly before the anæsthetic was commenced. Two turns of rubber tubing passed firmly around the head above the ears and brow, completely controlled the hemorrhage from the scalp, and proved in this case, as well as in others in which I have used it, a most satisfactory expedient. In order to locate on the skull the position of the trephine holes required, a tenotome was passed to the bone at two points about 1½ inches apart, and on a line parallel with and about ½ inch in front of the lower half of the Rolandic line. Through these small incisions a drill was passed into the external table. A large flap, with its convexity backward and its centre over the position of the proposed trephine holes, and including all the soft tissues, was raised. The centre-pin of a Roberts trephine, having a diameter of 1½ inches, was applied to the lower drill hole and a button started.

About the time the diploë was reached it was found that the trephine was useless; the perpendicular shaft was turning at its junction with the horizontal plate. Another Roberts trephine was applied with its centre at the other drill hole, and notwithstanding great care was used in its manipulation, it also met the same fate. The situation now was somewhat embarrassing. Other trephines were at hand, but none of them reliably aseptic. Fortunately, a good pair of bone-forceps was at hand and by their energetic use an opening was effected sufficiently large to admit the blade of a Hopkins gouge forceps; with these the enlargement of the opening to the size originally planned was easy.

The dura mater was normal in appearance but bulged somewhat, and no pulsation could be seen or felt. The edges of the opening in the bone having been smoothed up, a flap of dura mater was raised with its convexity upward and its borders about two lines from the bone. The

brain tissue was normal in appearance except for some bulging and an entire absence of pulsation. After the motor centres had been located by the electric battery as below described, a sharp probe was passed into the brain substance at about the middle of the opening, but with negative results. Two other punctures were made at intervals lower down. The lowest gave exit to clear fluid. An incision sufficient to admit the index finger was made into the brain tissue, and at the depth of about half an inch a cavity was reached with smooth walls and an oval outline. This was irrigated with distilled water and a rubber drain inserted.

The flap of dura mater was sutured with catgut and the scalp with silver wire. The drain was brought through an incision in the scalp flap.

The rubber tube was withdrawn in three days. The wound pursued the usual aseptic course of healing and, after the recovery from the anæsthetic, it might be said that the patient experienced no ill effects whatever from the operation. During his stay in hospital the pulsation of the brain continued to be plainly seen.

REMARKS BY DR. DILLER.

When the dura beneath the opening in the skull had been turned aside and the convolutions covered only by the pia mater were exposed, a fissure supposed to be the Rolandic was seen running downward and forward. It was situated a little posterior to a line drawn through the middle of the opening in its longest axis, and was more posterior to this imaginary line in the lower than in the upper part of the opening. Two small metal electrodes rendered aseptic, attached to a faradic battery, were applied to the exposed convolutions. Those in the lowest part of the opening were stimulated, first on one side of the Rolandic fissure and then on the other, the electrodes being kept as close together as possible. The convolutions were in this way stimulated at short intervals from the lowest to the highest extremity of the aperture in the skull. No contraction followed until a point on the ascending parietal about the middle of the opening was reached, when distinct movement of the right thumb in flexion took place. The electrodes were then moved across the fissure at a trifle higher point, when their application on the ascending frontal produced contraction of the fingers of right hand. The electrodes were then moved up the ascending frontal convolution to the uppermost limit of the opening, when movement of the wrist, elbow, and shoulder occurred in turn. The ascending parietal was then stimulated at several points in its upper half, but no contractions ensued, the thumb contraction, already described, being the only phenomenon which resulted from stimulation of this convolution.

I saw the patient about five hours after the operation, when he voluntarily moved the affected arm and hand more than I had ever before seen him move them. He was forbidden to attempt any movements until three weeks after the operation. At the end of this time he was tested, when he showed a slight, although distinct gain of power in all the affected parts except his hand and fingers, in which paralysis continued to be almost absolute until September 26th. On that day I applied the faradic current to the affected hand and arm. A few hours afterward he was able to execute slight movements in the fingers. Since Sep-

tember 26th he has had the faradic current applied on alternate days to the face, arm, and hand. Under this treatment he has been making slow but steady improvement. But the improvement in the aphasia and the paresis in the face and leg is most marked. The improvement in the arm, especially in the forearm and hand, is less noticeable. He cannot flex fingers sufficiently to make a fist. He flexes the forearm upon the arm well, but cannot raise the arm to a right angle with the body.

His general health is much improved, and he has been free from headache, vertigo, and vomiting since the operation. Sensation of all kinds remains intact as before the operation.

The second day after the operation, a spasm of the entire right arm occurred, and during the first three weeks following the operation, eight or ten more or less similar attacks occurred. The first five were confined to arm, forearm, and hand; subsequently they became confined to the forearm and hand, and later to the thumb alone. Then an interval of two weeks occurred during which he had only one or two slight twitchings in the fingers. On September 27th, the day following my first electrical treatment, a general convulsion, lasting six or seven minutes, occurred. He was conscious during this attack, as he had been during all his previous convulsions. But few spasms have occurred up to date (February 13, 1893) since this general convulsion.

I am inclined to attribute, in part at least, the great number of spasms which have occurred since the operation to the irritation set up by the operation. Happily, the convulsions are becoming much less frequent; and it may not be too much to hope that they will disappear altogether. Of course, there is the possibility of the cyst refilling. But I think more pressure than formerly would be required to set up the same train of symptoms, as the dura over the aperture will allow for more intra-cranial pressure.

While the result of the operation has fallen considerably short of an entire cure, and is in a measure disappointing, yet it has been followed by distinct and unmistakable benefit to the patient. The man himself feels this and is a good deal encouraged. It is still too early to tell what the ultimate result will be.

Turning now to the lessons in localization of function of the brain taught by this case, there are several points worthy of notice.

The case offers strong evidence in support of the view that the ascending frontal convolution is exclusively related to motor functions. For with an extensive and marked paresis it has been seen that sensation of all kinds, including muscular sense, remained intact in the affected parts.

The cortical representation for the arm, forearm, and hand is located chiefly in the ascending frontal convolution—more so than is indicated in Ferrier's scheme. The cortical subdivisions of the arm area are related to each other as follows in the ascending frontal convolution: That for shoulder is highest; that for elbow, wrist, and fingers are found

below it in the order named. The centre for the thumb is located in the ascending parietal convolution, closely adjacent to, posterior to, and a little below that for the fingers.

The theory that a sub-cortical lesion is apt to produce paresis before convulsions finds confirmation in this case.

Finally, the general principles of localization as enunciated by Horsley, Seguin, Mills, Knapp, Starr, and other localizationists, are well exemplified in this case.

A SUGGESTED IMPROVEMENT IN THE CORRECTION OF LENSES FOR PHOTOMICROGRAPHY, PHOTOGRAPHY, AND PHOTASTROGRAPHY.

By Henry G. Piffard, A.M., M.D.,
PROFESSOR OF CLINICAL DERMATOLOGY, UNIVERSITY OF THE CITY OF NEW YORK; CONSULTING SURGEON TO THE CITY HOSPITAL, AND TO THE BUREAU OF OUT-DOOR RELIEF, BELLEVUE HOSPITAL, ETC.

Prior to the time of the late Col. J. J. Woodward, M.D., Surgeon of the United States Army, say twenty-five years ago, photomicrography was in its first infancy. It is true that photographs of microscopic objects had been made, but they were crude and unsatisfactory, and were all made with what we would call low-power objectives. Although the objectives then made were of excellent construction and well adapted to the revelation of the structure of minute objects to the eye, yet the photographs made with them were greatly inferior in clearness and sharpness to the virtual image appreciated by the retina. The cause of this was not far to seek, and was due to the lack of coincidence of the visual with the so-called actinic focus. At the period mentioned the art of photography was almost exclusively practised with the aid of collodio-iodide plates, which were very sensitive to the blue, violet, and ultra-violet (more refrangible), and but feebly sensitive to the green, yellow, and red (less refrangible) rays. *Per contra*, these latter rays impress the eye so forcibly that the effect of the more refrangible rays is almost obscured—that is, when mingled with the others, as in ordinary white light. The practical outcome of this condition was, that when the ground glass of the camera was in a position that gave the sharpest image to the eye, this image could not be duplicated as to sharpness in the developed photographic plate occupying the plane previously occupied by the ground-glass.

In order to obtain a sharp photographic image it was necessary either to shorten the anterior conjugate focus, which involved the veriest guess-work, and was practically unavailable, or else to move the plate to a

point nearer the lens where the actinic rays came to their posterior conjugate focus. This was perfectly practical, and by repeated experiment the relation of the actinic to the visual focus in a given lens could be ascertained. Although practical, this method was hardly satisfactory.

In ordinary photography, the difficulty attending this difference in the natural positions of the actinic and visual foci had already been overcome by making the visual focus correspond with the actinic by constructing the lens so that it should be left in a state of moderate "under-correction," as it is termed by opticians.

Among the first to appreciate the value of this, as applied to photomicrography, was Colonel Woodward, and the first opticians to give it practical form were, I believe, Mr. William Wales, of New York, and Mr. Ernst Gundlach, then of Berlin, but now for many years a practical optician in this country. This example was followed by Tolles, of Boston; Powell & Leland, of London, and others.

Woodward was one of the most accomplished microscopists, so far as the manipulation of the instrument was concerned, that ever lived. His skill in securing the virtual image and in projecting the real image was at that time equalled by few and probably surpassed by none.

With Woodward's skill and the possession of lenses specially adapted to his purpose, the results obtained by him were the wonder of the scientific world.

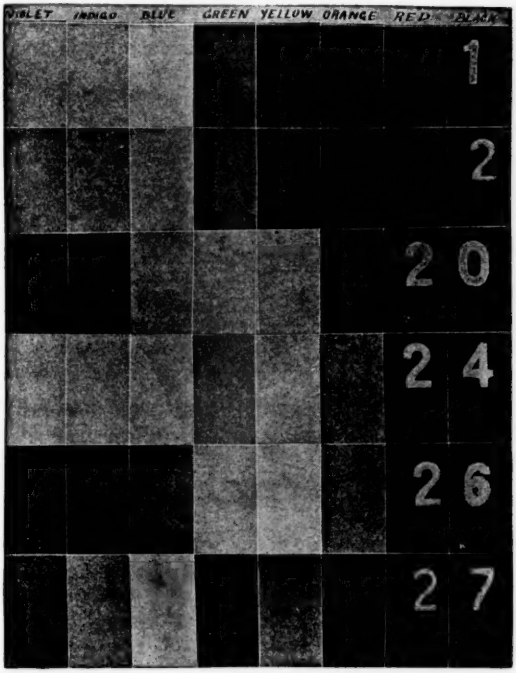
Since his time photomicrography has, in the main, followed the paths he marked out, and the improvements in the art since then have simply kept pace with the gradual improvement of the objective, and especially in the direction of increased apertures. One notable advance in the technique, however, is Abbé's happy conception of the projection ocular.[1]

The cellodio-iodide gave place some years ago to the gelatino-bromide plate, which, like its predecessor, is especially sensitive to the blue and more refrangible rays, and almost wholly insensitive to those which give the strongest visual impression. The relative sensitiveness of such a plate to pigment colors is clearly shown in the annexed photograph of an artificial spectrum. (See figure.)

In order to obtain the sharpest image on such a plate the lens must of necessity be under-corrected, as already stated. In accomplishing this, however, there is a certain loss of visual excellence which, however, is of little moment in ordinary photography. That this under-correction of lenses for photomicrography results in an impairment of their visual excellence is well known to opticians, but has thus far received but little notice from the actual users of the lenses in question. A few recent writers, however, have directed attention to the matter.

[1] Peculiar advantages have been claimed in behalf of objectives constructed according to the so-called "apochromatic" system. These lenses, however, possess certain disadvantages which restrain me from giving them unqualified commendation.

Londe (*La Photographie Médicale*, Paris, 1893) says: "The first and most important question is the choice of objectives. These may be excellent for observation and more than mediocre for photography."



Photograph of artificial spectrum.

Mercer (*Journ. Royal Micro. Soc.*, June, 1892), in speaking of some of the objectives used by him in photomicrography, says: "The Wales objectives are corrected spherically for the violet ray. The violet image is, therefore, somewhat superior to the visual, with which, however, it is coincident."

Czapski, in a letter published in Van Heurck's treatise on *The Microscope*, London, 1893, says: "In every case the objectives specially constructed by opticians for photography can never be advantageously employed for observations, and inversely."

From the foregoing it will be clear that lenses which were best for visual purposes were not the best for photographic use, and it was necessary, therefore, when the most perfect results were sought in both depart-

ments, to have a double set of objectives, and many investigators did provide themselves with such an outfit."[1]

The inconvenience and lack of economy involved in this arrangement is manifest, but how to obviate it does not appear to have occurred to opticians or others interested in the subject.

Having been practically familiar with photography and photomicrography for upward of twenty years, I have had the opportunity in that period to become reasonably familiar with the inherent defects of their technique, but it was not until the latter part of 1891 that I perceived that a way out of the difficulty might be readily found.

During the past five or six years the manufacturers of gelatino-bromide plates have placed on the market plates which are extremely sensitive to yellow light, and but feebly so to the blue, violet, ultra-violet rays of the spectrum, as will be perceived on examination of the band marked 26 (see figure), and comparing it with band marked 1, of the same figure. (The other bands do not concern the purposes of this paper.)

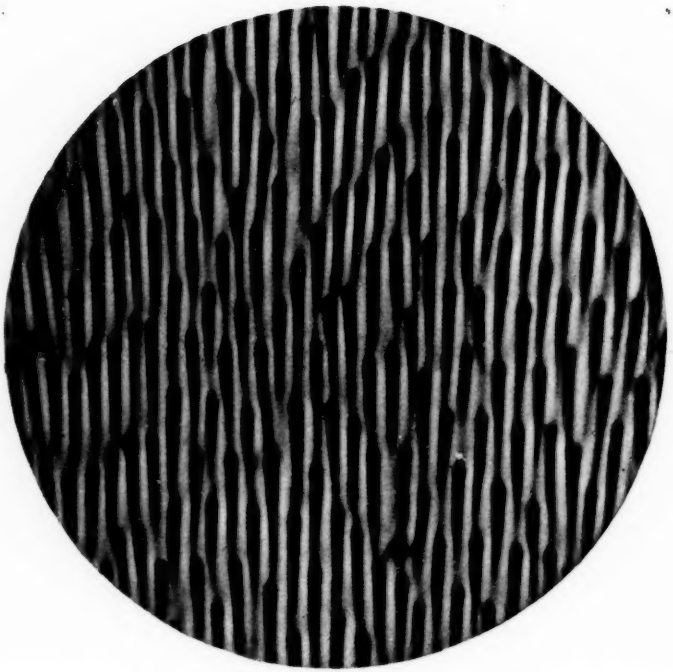
If now the objective be corrected for yellow instead of for blue or violet light, the negative being made on one of these yellow sensitive or so-called "orthochromatic" plates, there should be an exact correspondence of the visual and chemical foci, and the resulting picture should be superior to one that could be obtained by the ordinary procedures—that is, an under corrected lens and blue-sensitive plate; and at the same time the objective would not have its visual excellence impaired, supposing, of course, that the optician performs his part of the work with care and skill.

In order to test the practical value of this theoretical reasoning, I requested Mr. H. R. Spencer, now of the Spencer & Smith Optical Co., of Buffalo, N. Y., to calculate the formula and construct a lens which would fulfil the stated requirements. The result was a lens of 1/6" equivalent focus, and possessing a numerical aperture of 1.35. With this objective I have resolved and photographed the *Amphipleura pellucida* in lines, and have photographed both the *Navicula rhomboides* and the *Van Heurckia crassinervis* in lines and beads.[2]

In ordinary histological work, with amplification ranging from 200 to 400 diameters, the results with this lens have been very much more satisfactory than I have been able to obtain by any other combination of lenses or plates.

[1] It must be admitted that some of the apochromatics of short focus (2 mm.) obviate, in a measure, this difficulty, but those of longer focus have not, at least in my hands, proved satisfactory.

[2] As regards the last-named object, it has been previously photographed in beads, so far as I am aware, only by Van Heurck with the aid of a lens of higher power 1/8" and much larger aperture (N. A. 1.60).



Photomicrograph of the TEST PODURA (LEPIDOCYRTIS CURVICOLLIS). × 3000.
By HENRY G. PIFFARD, M.D.

Spencer & Smith obj. 1/15. N. A. 1.35.

To face page 27.]

With a 1/4″ objective of the same construction, made by Spencer & Smith on the order of Dr. J. A. Fordyce, of this city, I have resolved the *A. pellucida* with white light, and have demonstrated the resolution to him and to others. With a 1/15″ of the same construction, the property of Dr. J. H. Kellogg, of Battle Creek, Mich., I made the photograph of the podura which accompanies this paper. (See Plate.)

In order to further test the correctness of the principles involved, I requested Mr. Turner, of the Gundlach Optical Co., Rochester, N. Y., to make a 3/4″ lens of moderate aperture (N. A. 0.33.) Considering the power, aperture, and price ($12), the lens gave very satisfactory results, and wholly confirmatory of the theoretical demand.

In using these lenses with yellow sensitive plates there is a distinct gain in definition and purity of image, both visual and photographic, if the object be illuminated with light of corresponding refrangibility (λ 5892). This may be obtained absolutely by employing a sodium-flame, or approximately by intercepting the white light with a medium capable of absorbing the rays of short wave-length.

For the greater part of photomicrographic work, and especially that which deals with histology, I unhesitatingly recommend the technique here described, which, briefly stated, consists in the use of objectives whose corrections shall be adjusted to the D instead of the G or H lines, and in connection with plates specially sensitive to D light, and having the object illuminated as near as may be with rays of the same refrangibility.

If, however, we have to deal with objects in which we must resolve or optically separate particles whose approximation to each other is less than, say, $\frac{1}{100000}$ of an inch, the foregoing statements do not apply.

The studies of Helmholtz and of Abbé have placed us in possession of a formula which appears to be theoretically and practically true, and may be expressed as follows:

$$\text{R. - p.} = \frac{\text{n. x sin. u.}}{\lambda}$$

"R. - p." here indicates the resolving power of the objective; "n." the refractive index of the medium lying between the cover-glass of the object and the front lens of the objective (be the same air, water, glycerin, or oil); "u." the semi-angle of the aperture of the objective; sin. the natural sine of said semi-angle; and "λ" the wave-length of the light employed. Now the "numerical aperture" of the lens is equal to n. x sin. u., and the equation becomes simplified into

$$\text{R. - p.} = \frac{\text{N. A.}}{\lambda}$$

From this it will be seen that if we desire to obtain extreme resolution, it is necessary to employ objectives of the greatest numerical aperture, and employ in connection therewith such visible rays as possess the shortest wave-lengths. For the photographic reproductions of such images blue-violet sensitive plates, with under-corrected lenses and approximately blue or violet illumination (Woodward's technique) will give the best results. At the present time Mr. E. M. Nelson, of London, is devoting special attention to the development of this branch of photomicrography.

It will be noted that the formula above given does not take into account the equivalent focus or magnifying power of the lens; in other words, that this factor has no influence on the resolving power of the objective. This is correct. A well-connected 1″ objective will resolve exactly as well as an equally good 1/4″, provided the factors N. A. and λ remain the same. I here allude to this matter, as every few years someone imagines that he is on the verge of great discoveries to be brought about by the simple feat of increasing the amplification of the image. Let us assume that a photograph be made with an amplification of 3000 diameters, with N. A. the greatest and λ the least possible. This photograph may then be further enlarged to 30,000 or 300,000, but the enlarged pictures will not show any finer or more intimate structure than was delineated on the original smaller picture.[1]

Although orthochromatic or isochromatic plates have been regular articles of commerce for several years, they are used by practical photographers to a limited extent only. This is due to the fact that, despite the acknowledged superiority of the plates themselves, the negatives made on them with the lenses ordinarily at command have not yielded as satisfactory results in some respects as were obtained on the older blue-sensitive plates. The reason of this is almost self-evident. All ordinary photographic lenses at present constructed are under-corrected, and intentionally so, in order to make the visual image agree with that

[1] Some months ago a friend, who is a sub-chief in one of the principal bacteriological laboratories of this city, remarked to the writer that the height of his ambition was to possess and work with a Zeiss 1/18″ apochromatic. I replied that if he fancied Zeiss lenses he had better select a 1/12″, as with it he would be able to do more and better work in the line of research and discovery than with the 1/18″. My reply was evidently received with extreme incredulity. If we refer to Zeiss' catalogue, we shall find that the numerical aperture of the 1/18″ is given as 1.18, but the 1/12″ of the same matter has a N. A. of 1.30. He makes still another 1/12″ N. A. 1.40. Applying these figures to the equation above given, and assuming for white light λ 5269, we shall find that the 1/18″ will resolve or differentiate particles that approach each other as closely as about 114,000 to the inch, while the 1/12″ of N. A. 1.30 will resolve particles as close as about 125,000 to the inch, and the 1/12″, N. A. 1.40, will take optical cognizance of lines or particles that approximate each other to within about $\frac{1}{135000}$ of an inch.

formed by the shorter wave-lengths to which alone the old-style plates are sensitive.

If for any reason the photographer desires to use orthochromatic plates, either for copying, for portraiture, or in general landscape work, the only rational procedure is to use lenses that are specially corrected for them. To carry out this idea the Gundlach Optical Co. kindly constructed an 8 x 10″ "rapid rectigraph" lens of 13″ equivalent focus corrected for the D instead of the G line of the spectrum. The performance of the lens has fully justified the induction that led to its construction.

When orthochromatic plates first came into general use, the astronomers seized on them with avidity; but it was not long before they became dissatisfied with the results. At a recent astronomical congress in France the sentiment of the majority of those present was that more faithful and satisfactory images of the heavenly bodies were obtained on the blue than on the yellow sensitive plates.

Little of value had been done in photastrography until the late Mr. Lewis Rutherford, of New York, produced some photographs of the moon which greatly surpassed any of the sort that had been previously accomplished with the refracting telescope.[1] Rutherford used a telescope with the objective so extremely under-corrected that it was almost useless for visual purposes. This lens, it is almost needless to say, was specially corrected for the shorter wave-lengths, to be used in connection with wet collodion blue-sensitive plates, the only ones at that time available. Some astronomers employ a telescope corrected for best visual definition and a duplicate specially corrected for photography, and it is the latter that they have usually employed with the orthochromatic plates. The reason, then, that these plates have fallen into disfavor with many of them is due to the fact that they have used the wrong lenses with the right plates.

One of the principal advantages connected with yellow-sensitive plates is their ability to record the details of distant objects in a more satisfactory manner than is possible with the ordinary ones. Some four years ago the writer called attention (*Anthony's Photo. Bull.*, February 9, 1889) to the *graphotelic* properties of these plates in connection with landscape photography. If this special attribute of yellow-sensitive plates is of value in connection with distances limited by, perhaps, a score of miles, it certainly seems that it should not be overlooked by those who work their lenses with the anterior conjugate focus many millions of times greater than the posterior.

[1] I am not unmindful of the magnificent work done by Dr. Henry Draper with his reflecting telescope.

CASES OF BONE IMPLANTATION AND TRANSPLANTATION FOR CYST OF TIBIA, OSTEOMYELITIC CAVITIES, AND UNUNITED FRACTURE.[1]

By B. Farquhar Curtis, M.D.,
SURGEON TO ST. LUKE'S HOSPITAL AND TO THE NEW YORK CANCER HOSPITAL.

Various methods have been suggested for dealing with cavities or losses of substance in bones, whether caused by disease, by accident, or by operation. Omitting such plans of treatment as sliding forward flaps of bone left in contact with the soft parts, turning in the surrounding skin, and skin-grafting, there are left for consideration those methods which seek to fill the gap by placing in it some solid material, either living or dead, and also Schede's blood-clot healing. The solid materials used for this purpose may be classified as follows:

1. Foreign substances;
   - *a.* Non-absorbable, such as various metals, celluloid, plaster-of-Paris (Dreesman[1]).
   - *b.* Absorbable, such as catgut, Halstead's "fibre," sponge, decalcified bone, simple dead bone, ivory.
2. Living bone;
   - *a.* From another species.
   - *b.* From the same species or the same individual.

These various materials have all been made to heal-in in bone cavities, the only difference being that ultimate success is most difficult to obtain with the least absorbable. The principal questions remaining for discussion are as to the final results, the ultimate fate of the implanted material, the general applicability of the methods, and the choice of the best method to suit an individual case.

The non-absorbable materials all have the common fault that they remain continuously unchanged as foreign bodies encapsulated in the tissues, being a constant source of danger—for at any time some slight injury may disturb the balance which exists between them and the surrounding parts, and result in their final extrusion.

The absorbable substances are inserted with the idea of giving temporary support, of providing a sort of scaffolding for the new tissue to grow in, or perhaps merely to provide a temporary filling of the cavity which will allow superficial union to take place, so that the patient will be free from an external wound while the true healing is going on below. The substances in use vary all the way from catgut to ivory, for it has been proven by experiment that ordinary dead bone and

[1] Read before the Surgical Section of the New York Academy of Medicine, March 13, 1893.

[2] Beiträge z. klin. Chirurgie, 1892, ix. 804.

ivory are slowly attacked, eroded, and absorbed by the living bone cells around them, although in the case of ivory this process in an exceedingly slow one. Catgut is so absorbable that it is very little better than blood-clot for this purpose. Halstead's "fibre" is difficult to prepare, and decalcified sponge is not always absorbed, hence, Senn's decalcified bone appears for the present the most practical material for use in the ordinary cases, while we are awaiting the ideal of the future—the insertion of a piece of living bone which will exactly fill the gap and will continue to live without absorption. It is true that the method of healing with the moist blood-clot gives good results, and that bone rapidly develops in cavities thus filled, but the use of decalcified bone is not so severe a test of the asepsis of the operative technique and of the cavity to be filled, for blood-clot is the best possible medium for the development of germs, whether introduced by the surgeon's fingers or left in the surrounding tissues after the removal of the products of inflammation, while the decalcified bone can not only be made thoroughly germ-free, but can be so impregnated with iodoform as to resist germ-growth. The Haversian canals, moreover, afford easy avenues for the growth of granulation tissue, and in some cases it has been observed that the bone turns of a rosy hue within a short time after implantation, apparently by imbibition of blood, two facts which probably explain why ossification so soon takes place in the tissues which replace the decalcified bone as it is absorbed. Simple dead bone and ivory have the disadvantage of too slow absorption, for as long as they are unabsorbed they are exposed to the same risks of extrusion as the metal and other inorganic foreign bodies.

Three successful cases of decalcified bone implantation, all done by me over a year ago, will give some idea of the immediate and final results to be hoped for from the method, and they also present some other interesting features in bone surgery.

CASE I. *Cyst of tibia; secondary implantation of decalcified bone; recovery.*—M. E. A., male, eighteen years of age, single, born in the United States. When a child he is said to have broken the right leg. At the age of twelve years he had an attack of pneumonia, and immediately after began to have pains in the head of the right tibia, coming on between sunset and sunrise. At first the attacks were occasional, later they became more frequent and severe, and finally for a year he was bedridden. He was treated by many physicians who supposed he had rheumatism. About six months before entering St. Luke's Hospital, a swelling appeared over the seat of the pain, but this disappeared slowly and spontaneously. He was admitted in October, 1891, to the service of Dr. L. Bolton Bangs, to whom I am indebted for the opportunity for making the bone implantation and of reporting the case. There was no sign of swelling or redness, and no febrile or other constitutional disturbance, but the diagnosis of bone abscess was made. Under anæsthesia an incision was made upon the affected bone, and the periosteum

was not found to be thickened in the least. With a few strokes of the chisel, the thin roof of a cavity in the bone was pierced, just below the tuberosity of the tibia. The cavity was of the shape and size of a small hen's egg, with smooth walls, lined with a thin layer of granulation tissue, and containing a clear serum. The greater part of the anterior wall of the cavity was cut away, and the bone seen in this section and under the granulation-tissue lining when removed by the curette, appeared perfectly healthy, without a sign of cartilage or other new growth, but was rather denser than usual. The cavity was packed with gauze. The serum removed coagulated completely in a test-tube on boiling. Microscopic examination of the lining tissue, made by Dr. John S. Thacher, pathologist to the hospital, proved it to be simple granulation tissue. There was no trace of echinococci in the serum.

November 5, 1891, Dr. Bangs allowed me to fill this cavity with decalcified bone chips. It was granulating and in a perfectly aseptic condition, and ether having been administered, the granulations were removed with the curette, decalcified bone chips sprinkled with iodoform were packed in tightly, and the skin united over them without drainage. Primary union was obtained with the exception of a small sinus. On December 24th the patient was discharged. (Patient exhibited.) He tells me that the sinus remained open until March, 1892, discharging little serum but never any solid particles, and then it healed spontaneously. His health has been excellent ever since, and he walks freely without pain. The scar is smooth and not adherent to the bone, and the surface of the bone beneath it is flat, smooth, and perfectly hard.

I know of only two cases on record like the present, for the great majority of bone cysts give clear evidence of having originated from degeneration of solid tumors, according to Virchow's hypothesis. These two are the cases of Sonnenburg (*Deut. Zeitschr. f. Chir.*, 1879, xii. p. 314) and Schlange (*Arch. f. klin. Chir.*, 1887, xxxvi. p. 117), and it is worthy of note that both were of traumatic origin, occurred in young individuals (twelve and fourteen years of age), and remained free from recurrence when seen months later. In the first case, Von Recklinghausen examined fragments of the walls of the cavity microscopically, and found no indication of neoplasm. Schlange suggests that these cysts originate in a mild osteomyelitis, not severe enough to result in the production of pus, similar to the serous abscesses found elsewhere and lately studied by Nicaise (*Rev. de Chirurgie*, June, 1892, p. 512).

Case II. *Osteomyelitic abscess of humerus; evacuation; secondary implantation of bone, with suture of injured musculo spiral nerve; complete recovery.*—F. F., thirteen years of age, born in New York City, schoolboy, good personal and family history. Referred to me by Dr. John Ridlon, October 14, 1891. Eight weeks before he was seen by me he was struck upon the left shoulder, over the scapula, by a large stone. The contusion was recovered from under treatment, and he had no further trouble until two weeks ago, when, without any cause, he was seized with great pain in the left humerus, much increased by any attempt at motion. The pain grew worse for a week, and at the

end of that time his health began to fail from loss of appetite and sleep. He has had attacks of sweating at night, but no chill. His temperature at present (morning—taken in the mouth) is only 99°. The boy appears to be in great pain, the left arm hanging powerless from the shoulder, as if paralyzed, and he is unable to sit still, trying constantly to ease the left arm by changing its position, generally by moving it with the other hand. There is no trace now of the injury to the shoulder. Passive motion in the shoulder and elbow joints is good on careful handling. The entire shaft of the humerus is tender to pressure, apparently most tender at the condyles, and pressure in its long axis is also painful. There is no swelling anywhere, and no hyperæsthesia or reddening of the skin. Rest, wet dressings, and morphine during the following two days were without effect, the pain increasing constantly; and although no special point of attack could be selected, interference became absolutely necessary, and he was admitted to my service at St. Luke's Hospital October 17, 1891. His afternoon temperature had heretofore been unknown, but just before operation it was found to be 104°.

Operation. Ether anæsthesia. The inner side of the arm appearing to be the most tender, an incision was made at that point down to the bone, but no trace of inflammation was found anywhere, not even in the periosteum or on the surface of the bone, and the incision was closed with sutures. An incision was then made upon the outer side of the arm, and still no sign of inflammation was found. The medullary cavity was then opened just above the middle of the shaft with the chisel, and it was found to be filled with thin creamy pus. This abscess cavity extended from below the middle of the shaft up to and penetrating the head of the bone, and after irrigation its outer wall was cut away for nearly its entire length and the wound packed. In enlarging the wound downward the musculo-spiral nerve was exposed, and one of its branches inadvertently wounded with the knife. Subsequent events proved that the entire nerve was divided, but how this occurred remains unknown —possibly it was torn across with the retractors. On account of the pus infecting the wound no attempt was made to suture the nerve at the time, especially as I expected to be able to implant the cavity with bone before many days. Primary union of the inner wound was obtained, and the condition of the outer one remained excellent, but some layers and spicules of necrosed bone kept forming on the walls of the cavity, and the patient was allowed to go home November 20th, with a granulating cavity and complete musculo-spiral paralysis. After some delay he finally entered the hospital again, and on February 22, 1892, the cavity in the bone was thoroughly exposed, curetted, and filled with the decalcified bone chips and iodoform. At the same time the musculo-spiral nerve was dissected out at the lower angle of the wound, and its separated ends freshened. The gap between its ends then amounted to nearly an inch, but by thorough stretching the ends were brought into contact and sutured with very fine catgut, the sutures passing through the entire thickness of the nerve.

Primary union was obtained throughout the wound, and the boy was discharged, to return for electrical treatment. He came back, however, only a few times, and for some months there was no improvement in the function of the paralyzed muscles, but power over them was first obvious during the following July, and when I saw him in August, six months after the operation, he could extend the fingers about half-way, the

thumb not so well. He now (patient exhibited) has such full power that it is impossible to tell without careful examination which was the injured arm. He tells me that during the summer a small "pimple" formed in the upper part of the scar and remained open for some time, but that has now closed entirely, although it has left a depression, probably showing where one chip of decalcified bone broke down. Otherwise the scar is non-adherent to the bone, and the latter is smooth, flat, and hard on its surface.

CASE III. *Osteomyelitis of os calcis; évidement; secondary implantation; recovery.*—S. T., thirteen years of age, school-boy, born in New York, admitted to St. Luke's Hospital in September, 1891. He had an osteomyelitis of the left os calcis, originating in a sprain received two months before, beginning with the usual signs of inflammation, and treated by incision. On admission, sinuses leading down into the body of the bone were found on both sides of the heel. On September 22d évidement was performed by two incisions, thoroughly exposing the bone, and almost the entire os calcis was found broken down and removed by the curette, leaving only a periosteal cavity and the articular cartilaginous surfaces. November 5, 1891, the cavity was granulating healthily, but had not grown much smaller, and its walls were slightly thickened with new bone formed from the periosteum. Ether was administered, the granulations were scraped out, the cavity tightly packed with decalcified bone chips and iodoform, and both incisions closely sutured. Primary union was obtained; no sinus formed; the boy went home just before Christmas, and began to use the foot about the end of the following month, January. Under date of March 6, 1893, he writes that the heel is a little "short," and that it occasionally aches when he uses it too much, but that he considers it as sound as ever. When not at school he does ordinary farm-work.

These three cases are the only ones which have come under my care and have appeared suitable for this method, and every one was successful, in spite of the considerable size of the cavities involved. I have had no experience with the method advocated by Kümmell (*Deutsche med. Wochenschr.*, 1891, xvii. 389) and LeDentu (Buscarlet: *Gaz. des Hôpitaux*, 1891, lxiv. 1361), of inserting large pieces of decalcified bone, filling the entire gap with one piece cut to fit it; but it appears to me that additional risk of failure is encountered in attempting to heal in such large pieces—in case of partial infection, for instance, the entire piece of bone would have to be removed, instead of having it quietly discharge itself through a small opening without affecting the general result.

In all of the methods hitherto considered we have been studying implantation of bone, for the term transplantation must be limited to the use of living bone. There is good experimental evidence,[1] as well as clinical experience,[2] to show that living bone will continue to live

[1] McGregor: Journ. Anat. and Physiol., London, 1891, xxvi. p. 220; contradicted by Schmitt, Arch. f. klin. Chirurgie, 1893, xlv. 401.

[2] Sherman: Pacific Med. Journ., June, 1889. McGraw: Internat. Med. Magazine, 1892, i. 572. Poncet: Lyon Médicale, 1886, No. 39. Buchanan: Med. and Surg. Reporter, 1892, lxvii. 526. McGill: Lancet, October, 1889. Forgue: Congr. franç. de Chirurgie, Trans., 1891, v. 617.

when transplanted from one part of the body to another, from one individual to another, and even from one species to another. It has also been proven that its life does not depend solely upon the periosteum, but upon the cells of the bone tissue themselves, so that even without any periosteum such a detached piece of bone will retain its vitality, enter into union with surrounding bone or periosteum, and not become absorbed, as is dead bone under similar circumstances. Such fragments should be small, and the smaller they are the more likely they will be to retain their vitality. This probably explains Kümmell's case, in which he transplanted a piece of the ulna into a gap in the radius of the same arm, caused by an ununited fracture, due to necrosis, and the piece became completely absorbed, while a single large piece of decalcified bone implanted at the same time into the gap he had made in the ulna was replaced by full osseous reproduction. Probably, however, the fact that the ulna was perfectly healthy while the bone of the radius was in an abnormal condition, as shown by the failure of bone production and occurrence of non-union of the original fracture, had something to do with this result.

About a year ago I succeeded in healing a gap in the tibia by bone transplantation. The history is briefly as follows:

CASE IV. *Transplantation of bone from fibula to tibia for ununited fracture.*—B. R., thirty-three years of age, single, born in northern New York, with a healthy personal and family history, was working at a planing machine, January 5, 1891, when his trousers caught in the belt which drove the machine, twisting his left leg and jamming it against the pulley over which the belt ran. He caught hold of the machine and did not fall, but received a compound fracture of the inferior third of the left tibia, the upper fragment projecting three inches through the skin; a simple fracture of the fibula, a simple transverse fracture of the left femur of the same limb at its middle, and possibly also one nearer the knee. The deformity of the tibia was reduced and splints applied; but this deformity recurred twice during treatment, requiring reduction, and finally resulted in necrosis, and the removal of a sequestrum over two inches in length, comprising apparently the entire thickness of the shaft of the tibia at the site of injury. Soon after this, while going about on crutches, three months after the original injury, he fell and broke his left femur again.

In June of that year he was admitted into St. Luke's Hospital—examination showing a deficiency in the shaft of the left tibia about two inches in length, with no attempt at the production of new bone. The lower half of the left femur was thickened and had a slight outward curve. There was marked fulness in the neighborhood of the left knee, and flexion was limited to 15°, apparently by bony contact. There was no fluid in the knee-joint. On the right side the distance from the anterior superior spine of the ilium to the internal malleolus measured 35¾ inches; on the left side the same measurement was only 33⅝. The left leg, however, measured fifteen inches from the knee to the ankle, while the right was only one-quarter of an inch longer, so that the

shortening was due almost entirely to the deformity in the femur. The patient was in good health in every way.

Operation, June 4th. Ether anæsthesia. An incision was made over the seat of fracture in the tibia, where the skin was marked with numerous scars, and showed that the ends of the fragments were tapering, and that the points lay in such a position that there was an oblique gap between them wide enough to easily contain the finger if laid in it, running from above downward and from without inward. To refresh and overlap these fragments, as would be necessary for secure wiring, would shorten the leg about two inches, and make the total shortening of the limb amount to four inches, consequently it was determined to attempt to fill the gap with a piece of bone from the fibula, and an incision was accordingly made over that bone at the same level. It was intended to divide the fibula squarely across, cutting out a fragment about an inch long, to be left in connection with its periosteum and the other soft parts as far as possible, and to push this fragment through an opening made between the muscles of the leg into the gap in the broken tibia. But the fibula had also been fractured obliquely just at this point, and the union was so weak that it gave way under the blows of the chisel employed to divide the bone, so that the best that could be done was to secure the desired length of bone in several fragments, some of which, perhaps, remained attached to the periosteum, but the greater part undoubtedly entirely isolated. The pieces were, however, not exposed to the air, but pushed through the opening made between the muscles and inserted in the oblique gap in the tibia, irrespective of whether compact or cancellous structure lay in contact with the freshened ends of the tibial fragments. The wounds were then closed by sutures—that over the tibia with great difficulty on account of the thickening and adhesion of the skin to the bone. The limb was put in plaster-of-Paris, the ends of the fragments being pressed somewhat together, shortening the leg a trifle.

Primary union was obtained, the temperature never rising above 100°, and the first dressing was made thirty-two days after the operation. A small sinus was found in the tibial wound. The bones were in good position and there was already some union. The sinus healed, and on August 13th union is noted as "fair." One month later, three months after the operation, as some motion (bending of the bone at the seat of fracture) was still present, a Thomas knee-splint was applied, so that the patient could walk about and bring some pressure to bear on the weak point at the same time that a stout leather legging held the bone stiff in the splint. Measurement made at that time showed the total shortening of the limb to amount to less than two inches. Not long after, signs of periosteal inflammation appeared and the old sinus reopened; therefore, on September 27th, this was explored under anæsthesia, an incision three inches long being made along the front of the tibia, the periosteum detached from its internal and posterior surface, where some granulation tissue was found and curetted away, but no necrotic or carious bone was detected. It was impossible to tell from inspection of the seat of fracture whether the transplanted pieces had lived or had been absorbed and replaced by new bone. Union was perfect and so solid that strong effort failed to bend the bone. November 19th, the wound, which had been treated by packing, had contracted to a narrow sinus, and the patient was discharged, wearing a high shoe and walking with a cane. Several months later he wrote to me that

this sinus still remained open and that he was packing it vigorously. I directed him to stop the packing, and on November 8, 1892, he reported that the sinus had closed spontaneously during the summer, and that he had been acting as a guide in the Adirondacks, carrying his boat as much as five miles at a stretch, being troubled only with a corn, which was due to the poor fit of his high shoe.

Before closing, it may be well to give a brief account of the technique employed in these operations, which was the ordinary aseptic technique in use at the hospital. The neighborhood of the wound was thoroughly cleansed and kept in a soft-soap poultice, followed by a 1 : 3000 bichloride dressing for twelve hours. The operators' hands were washed in soap and water, followed by a 1 : 1000 bichloride solution for three minutes by the clock. Instruments were boiled in 1 per cent. sodium carbonate solution for half an hour. Gauze, sterilized by steam heat, was employed for dressings, and instead of sponges, a narrow strip of rubber tissue was laid next to the wound, after having been washed and sterilized in a 1 : 1000 bichloride solution. Catgut for sutures and ligatures was sterilized by boiling in absolute alcohol for one hour. The decalcified bone was prepared according to Senn's directions, being decalcified in a 50 per cent. solution of hydrochloric acid for ten or fourteen days. The bone was taken from the compact substance of the beef-bone, cut into cubical pieces averaging about one-third of an inch in thickness. They were washed in weak alkaline solution after decalcification, and preserved in absolute alcohol. Just before use they were cut into small chips and sprinkled liberally with iodoform (not especially sterilized) as they were packed into the wound. Although we observed no symptoms of iodoform poisoning, caution is necessary in employing this drug, for Deaver[1] had a case of poisoning from its too free use for this purpose.

THE TREATMENT OF CHOLERA BY HYPODERMOCLYSIS AND ENTEROCLYSIS.[2]

By Judson Daland, M.D.,
of Philadelphia.

It is convenient in discussing this question, to divide the treatment according to the stage of the disease, and we shall therefore speak of—

1. The premonitory stage.
2. The evacuant, or stage collapse of, and
3. The stage of reaction.

[1] The Medical News, 1889, lv. 714.

[2] Read before the American Climatological Association at its meeting in Philadelphia, May 26, 1893.

In the way of prophylaxis but little need be said, as all are in accord with the statement that cholera is communicated from the sick to the well directly, and that the poison is usually swallowed. All, therefore, that is necessary in the way of prophylaxis is to prevent the swallowing of the cholera poison. This is best accomplished by avoiding ordinary water, and resorting to the exclusive use of distilled water, or carbonated water, or Apollinaris or other table waters of like character, and also by avoiding such foods as may be the carriers of the poison, more particularly partially cooked or uncooked vegetables, as well as fruits, salads, etc. When it is impossible to resort to distilled water, or to bottled waters, ordinary water may be boiled, and then used so soon as possible thereafter. Fruits and salads may have come in contact with the cholera germs, and, as they cannot be thoroughly cleansed, it would be wiser to omit their use. All foods should be thoroughly cooked, as the comma bacillus is destroyed at a temperature of 212° F. In times of epidemics the most scrupulous care should be taken regarding personal cleanliness; the hands should be thoroughly scrubbed with hot water, and, if there is reason for believing that one has actually been in contact with the disease, the hands should be sterilized by dipping them in a 1 : 500 solution of bichloride of mercury. Great care should be taken to avoid attacks of indigestion, and all foods taken should be nourishing and of easy digestibility.

1. Premonitory Stage.—The indications for the treatment of this stage, the diagnosis of which is difficult and often impossible without a biological examination of the gastric or intestinal discharges, are best met by placing the patient at rest in bed, and making sure that he is well protected from cold. His food should be of the simplest character, and preferably restricted to boiled milk, well-boiled rice, and milk-toast, which should be given in rather small quantities at intervals of two hours. As the digestion, both gastric and intestinal, is usually performed with difficulty, the administration of five grains of pepsin with the food would be of benefit. Insomuch as the cholera poison cannot grow in acid media, and as acids tend to destroy the cholera bacillus, the administration of an acid is strongly indicated. As hydrochloric acid is the natural acid of the gastric juice, and as it promotes thorough digestion, it is preferable to all others that have been suggested, though doubtless they are all valuable. I would suggest for an adult, thirty to forty drops in a tumbler of water; for an adolescent, from twenty to thirty drops, and for a child, ten drops every two or four hours. Tannic acid has been suggested by Cantani, of Naples, but I believe all vegetable acids are inferior to hydrochloric acid. Dr. Roland G. Curtin,[1] some years ago, obtained very valuable results in the prevention and treatment of

[1] "Hydrochloric Acid as a Prophylactic in Cholera," Philadelphia Medical Times, July 12, 1873.

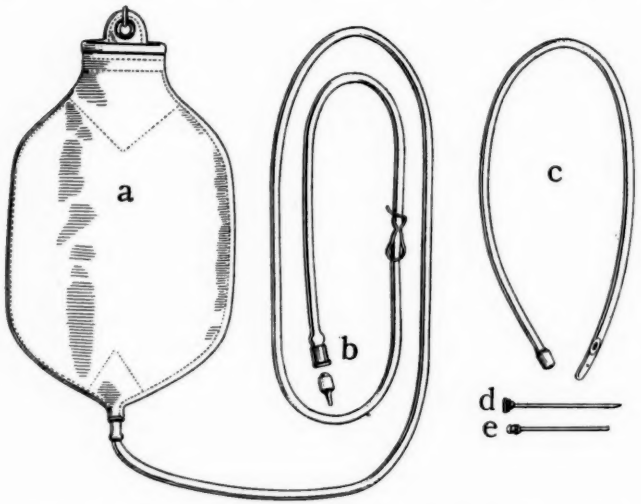
cholera by the use of aromatic sulphuric acid, in doses of twenty drops in four ounces of water, and succeeded in preventing the development of cholera in a large number of cases by its use during the epidemic of cholera in 1866 and 1867, while resident physician in the Insane Department of the Philadelphia Hospital.

In many cases it is impossible to recognize the premonitory stage, and perhaps in a majority of cases the physician has not the opportunity of seeing the patient until the stage of collapse has developed. I have observed several cases of Asiatic cholera in which this stage was absent, and in virulent cases quite uniformly the premonitory diarrhœa was slight, and often escaped observation.

2. The Evacuant, or Collapse Stage.—In this stage much can be done. The indications for treatment are unusually clear, and the methods of meeting these indications are very plain. In consequence of the enormous discharge of liquids from the stomach and bowels the entire organism is shrivelled and shrunken, and the blood loses a large portion of its watery element. As a result of this serous drain the red blood-corpuscles cannot circulate freely, and are therefore unable to pass to the lungs to take up their normal quantity of oxygen, or to throw off carbonic acid. This condition produces cyanosis, which shows itself quickly, and is more especially noted in the extremities and about the nose and lips.

Furthermore, in consequence of the great loss of liquids, the muscles get into a tonic spasm, they become hard and board-like in character, twisting and distorting the superior and inferior extremities, and exciting intense pain. To meet this indication it becomes necessary to administer liquids, but, unfortunately, vomiting and diarrhœa are constant, and attempts to administer liquids are usually followed by their prompt rejection. Attempts to administer liquids directly into the veins have been made, but in cholera all the veins are collapsed and are discovered with difficulty, and in many cases it is impossible to secure a vein of sufficient size for this purpose without proceeding to a formal operation for the exposing of those more deeply situated. This is particularly the case in children, and in this stage of cholera one does not feel justified in adding unnecessarily to the suffering of the patient. Moreover, this method of meeting this indication has not fulfilled the brilliant results that were confidently expected, and has now been abandoned. The most natural and simple method of supplying this want of the system for liquids is by the subcutaneous injection of a solution of $\frac{6}{10}$ per cent. (or two small teaspoonfuls) of sodium chloride in a quart of hot water (distilled and sterilized), to which two ounces of brandy may be added. The operation of hypodermoclysis was first employed by Cantani, at Naples, during the epidemic in 1865, and was again used by him with great success in 1885. The operation is one of great simplicity, requiring for this purpose a small-sized aspirating-

needle (*d*) and canula (*e*), which is attached to the rubber tube of an ordinary fountain syringe (*a*). The best point for the introduction of the needle is in either flank, between the ribs and the crest of the ilium; the inner surface of the thighs may also be used. Observation has shown that there is danger in the injection of liquids beneath the skin of the neck, as two cases of fatal œdema of the larynx following such injections have been reported. The operation should be performed in accordance with the well-known rules of antisepsis. The entire apparatus should be sterilized, and the skin that is about to be punctured should be first washed in soap and water, then alcohol, then ether, and afterward well saturated with a 1 : 500 solution of bichloride of mercury. A fold of the skin should then be grasped between the thumb and forefinger and elevated, and the needle introduced through the skin into the



subcutaneous space. When this operation is performed under these circumstances no unpleasant effects have been observed. In a large number of cases thus treated at the Swinburne Island Cholera Hospital, but one abscess developed, which was distinctly traceable to an infraction of the rules here advised. The first injection in an adult should be one or two quarts; for an adolescent one or two pints, and for an infant one-half pint. The solution should have a temperature in the reservoir of 110° F., which will be reduced to 105° F. after traversing the long tube to the subcutaneous space. The liquid should be slowly introduced by hydrostatic pressure, which may be regulated to a nicety by raising or lowering the reservoir. It requires twenty to thirty minutes to intro-

duce one quart of liquid, and ordinarily it is unnecessary to disperse the liquid by massage, though this should be advised in grave cases where rapid absorption is imperative. As it is natural to suppose, this subcutaneous liquid forms a large oval swelling, the size depending upon the amount introduced. In favorable cases absorption takes place in from twenty to forty-five minutes, but in some cases four hours are required. It therefore becomes evident that the rate of absorption is of great prognostic importance. If all the tissues are dried, and absorption takes place slowly, it is an evidence that the lymphatic, as well as the hæmic, circulation is at a low ebb, and that death is imminent. Occasionally when the operation is repeated frequently, the patient may complain of sensitiveness and pain, aggravated by light pressure over the region of the punctures, but this disappears within forty-eight hours. If, at the end of the first introduction, it is deemed desirable to introduce more liquid, a second puncture may be made in the other flank at a corresponding point on the opposite side, and injections may be made every two hours or less frequently, depending upon the condition of the patient.

The second great indication for treatment is to counteract the pathological process which may be going on in the intestinal mucous membrane—for, as is well known, the comma bacillus attacks the superficial layers of this membrane, and local treatment in this disease is, therefore, a most rational procedure. The bacillus of cholera has not been found in the blood nor in the viscera, and the supposition is that it generates an alkaloidal poison, which, by its absorption, produces many of the symptoms of the disease.

Recognizing the difficulty of introducing any substances by the mouth in view of the frequent acts of vomiting that occur, and from the fact that, when vomiting is not present, it is usually excited so soon as attempts are made to introduce *any* substances, it is clear that we must abandon in most cases all hope of medicating the intestinal mucous membrane by the oral administration of drugs, though in cases where the stomach is retentive this may be attempted, and, under these circumstances, one would naturally expect good results from one of the intestinal disinfectants, more particularly a substance like salol, or the salicylate of sodium. Personally, I have had no experience in the use of remedies by the mouth in this stage of cholera, as in the cases under my observation the stomach was non-retentive.

Our efforts failing in this direction, one's attention is naturally directed toward a remedial agent that may be introduced through the rectum. Here, again, we are met with an obstacle in the anatomy of the ileo-cæcal valve, which hinders the passage of liquids from the colon into the ileum. Prior to September, 1892, I was strong in the belief that the ileo-cæcal valve prevented absolutely the regurgitation of liquids from the colon into the ileum, and this has been the teaching of most

of our well-known anatomists. Recognizing the importance of solving this question, the following experiments were made:

A fountain syringe containing three pints of water was suspended at an elevation of five feet, and a rectal tube introduced for a distance of six to seven inches.

CASE I.—Male child, aged two years; dead of cholera; the liquid passed readily, filling the intestines and stomach.

CASE II.—Male child, aged two years; dead of marasmus; liquid passed freely, filling the intestines and stomach.

CASE III.—Child, aged six years; dead of measles; the liquid passed readily through the entire intestinal tract, and flowed from the mouth and nose.

CASE IV.—Child, aged three years; dead of measles; the liquid passed readily through the ileo-cæcal orifice, filling the small intestine.

CASE V.—Child, aged three years; dead of measles; the liquid refused to pass. A post-mortem examination showed that the colon was over-distended and that there was a twist in the ileum against which the distended colon pressed, rendering it impossible for liquid to pass into the ileum.

CASE VI.—Female child, aged eighteen months; dead of measles; the liquid failed to pass both before and after opening the abdominal cavity. In this case the ileo-cæcal valve was small and the lips of the valve were in close apposition, rendering it impossible for any liquid to pass from the colon into the small intestine.

CASE VII.—Child, aged two years; the liquid refused to pass; upon examination the ileo-cæcal valve was found to be competent.

These examinations show that in two cases the valve was competent to prevent irrigation of the small intestine; and in one case, owing to a peculiar twist in the ileum and the pressure of the over-distended colon, liquids failed to enter the ileum. This case is particularly instructive, and shows that in a certain number of cases success may be looked for, even though the first attempt prove a failure. In four cases there was no difficulty whatever in the passage of liquids from the anus to the stomach, or even out through the mouth and nose.

In addition to these facts, severalof my patients, to whom injections of tannic acid had been given, vomited tannic acid, thus proving that the solution had passed through the ileo-cæcal orifice.

The feasibility of introducing liquids from the rectum into the small intestines having thus been proven, the next question that naturally arose was as to the character of the liquids, and the method of application. Acting upon the knowledge that the comma bacillus is destroyed by acid, it is evident that this substance should be an acid; and, furthermore, this acid should be incapable of doing harm to the intestinal mucous membrane; a substance possessing astringent properties would also be of benefit; and further advantage would be secured by heating this liquid so as to supply warmth, as the temperature of cholera patients is usually subnormal. Of all the substances that have been

advanced to meet these indications, tannic acid is, in my opinion, the best, and the solution that was habitually used in the treatment of the cholera cases in New York Bay was a 2 per cent. solution of tannic acid in water (or three teaspoonfuls to the pint), at a temperature of 110° F. Of this solution two quarts may be given to an adult, one to an adolescent, and one pint to a child. The solution should be introduced very slowly, and I advise for this purpose the use of a medium-sized soft rubber tube having a diameter of one-fourth of an inch. The one found most useful was originally intended for lavage. It should have one outlet one-half inch from the extremity, and a second on the opposite side two inches from the extremity, and the terminal portion should be closed so as to present a rounded extremity, which greatly facilitates its introduction (*c*). In an adult this tube should be thoroughly warmed, well oiled, and gently and slowly introduced into the rectum by a rotary movement and slight pressure, for a distance of ten inches. Occasionally the first attempt will be unsuccessful, in which event the same procedure should be repeated, changing slightly the direction of the tube. To this soft-rubber rectal tube should be attached an ordinary fountain syringe (*a*), which is the same as the one suggested for hypodermoclysis. The liquid in the reservoir should have a temperature of 110° F., which will be lowered 5° before it will have entered the small intestines. The advantages of this simple apparatus are that the hydrostatic pressure may be modified immediately to suit the particular case in question, and in this manner the rate of discharge of the liquid may be regulated. It is absolutely necessary that the tannic acid solution should be *slowly* introduced, and ten minutes should be required for the introduction of one quart of this liquid. Three or four minutes should be allowed to elapse, while gentle pressure is made on the anus, and the patient should be encouraged to retain the injection, even though there be a strong desire to evacuate it. Not infrequently, if this desire is overcome, it will be retained without further difficulty. The tube should be slowly withdrawn. If the injection is retained, it will inhibit the growth of the comma bacillus; it will supply heat to the body in the most advantageous manner possible, and, if absorption takes place, it will supply a much-needed fluid. If the liquid be rejected the first objects are obtained in part, and the intestinal tract is flushed of its contents, thereby removing poisonous material which, by absorption, would endanger life. In severe cases enteroclysis may be repeated as often as every four hours.

As *coldness* of the body and *lowering* of the *central temperature* is an almost constant condition in Asiatic cholera, it becomes necessary to supply heat. This has been accomplished by heating the liquids used in hypodermoclysis and enteroclysis, and also by the hot plunge bath, which should always be given to patients in this stage. This bath may

be repeated as often as is deemed desirable; and I should further advise that the entire skin surface be covered by soft, woollen under-garments immediately thereafter, and from time to time hot air may be conducted beneath the bed-clothing. Advantage may also be taken of hot air; hot-water bags; hot sand bags, or hot bricks, which may be placed near the body, more particularly about the extremities. The patient should be covered by two woollen blankets and a counterpane. A most excellent suggestion, by which heat may be added to the body, has been made by Dr. Francis X. Dercum, namely, that the patient be placed upon a water-bed, which may be filled with hot water.

Stimulation. The best method of administering stimulants is by deep hypodermatic injections of brandy, repeated every hour or less frequently, according to indications. For an adult, 30 minims may be employed; for an adolescent, 15; and for an infant, 5 minims. During the stage of collapse, if, at any time, there is a tendency to vomiting, it is wise to avoid administering *any* substances by the mouth.

Lavage. As the stomach frequently contains large quantities of choleraic liquid, it is often advisable that a soft-rubber stomach-tube be introduced, and that lavage be thoroughly performed, using for this purpose a hot tannic acid solution, such as is employed in enteroclysis.

Nourishment. The only nourishment that should be administered is peptonized or sterilized milk in small quantities, about two ounces every two hours. If this is not well received, it may be surcharged with carbonic acid gas, or koumyss may be substituted. Iced champagne, in small quantities, may also be given. The only liquid that should be permitted is carbonated distilled water, or table waters, such as Apollinaris. Twenty to forty drops of hydrochloric acid may be administered with the carbonated water at intervals of four hours.

Drugs. In all the cases of cholera that I have treated no drugs have been employed other than those before mentioned. Particularly conspicuous is the omission of opium and of those drugs which have been universally advised in this disease. The only cases where drugs became necessary were those where intense pain was caused by muscular cramps, in which event to an adult was given morphine $\frac{1}{6}$, and atropine $\frac{1}{100}$, hypodermatically into the muscles affected. This symptom of cholera was rarely met with in the cases treated by hypodermoclysis and enteroclysis, and this rarity is easily understood when it is remembered that the muscular symptoms are the result of the obstruction of liquids from the tissues of the body, so that, when liquids are supplied, this symptom rarely appears. The enormous list of remedies suggested, such as camphor, capsicum, chloroform, creasote, turpentine, amyl nitrite, arsenic, phosphorus, copper, lead, etc., I believe to be not only useless but harmful.

3. Stage of Reaction.—During this stage the quantity of liquid food may be increased as well as the quantity of liquids. The hydrochloric acid should also be continued. If the suppression of urine, which is almost invariably present in the stage of collapse, continues, this would be an indication for the continuance of hypodermoclysis at intervals of eight hours. The enteroclysis should now be suspended. If the temperature is normal, artificial heat should be withdrawn; and if reactive fever shows itself, the woollen under-garments should be removed and the patient should be covered with a very light-weight woollen blanket. In order to encourage more perfect digestion, five grains of pepsin should be administered along with the hydrochloric acid. In favorable, uncomplicated cases the amount of nourishment may be gradually increased, passing from liquid food to more solid substances, such as boiled rice, bread saturated with milk, junket, poached *white* of egg, etc., gradually returning to ordinary food. In those cases where the typhoid stage of the patient remains, the hypodermoclysis should be repeated once or twice daily, and, in addition to what has been suggested, $\frac{1}{40}$ grain of strychnine and three grains of quinine may be administered every four hours, along with the hydrochloric acid and pepsin.

PUERPERAL INFECTION CONSIDERED FROM A BACTERIOLOGICAL POINT OF VIEW, WITH SPECIAL REFERENCE TO THE QUESTION OF AUTO-INFECTION.[1]

By J. Whitridge Williams, M.D.,
Associate in Obstetrics, Johns Hopkins University,

(*From the Pathological Laboratory of the Johns Hopkins University and Hospital.*)

To Ignaz Semmelweiss is due the credit for having rescued the puerperal diseases from the realm of hypothesis and theory, and for demonstrating that in the vast majority of cases they are due to infection from without, and thus placing them, to a greater or less degree, within the category of preventable affections.

His great services were not at first appreciated, and not until the introduction of antiseptic methods into surgery did they receive the attention which they merited. With the advances in anti- and a-septic surgery, however, it was found that his views were based upon sound observation and were entitled to the greatest possible consideration; so that now he is justly regarded as the father of antiseptic midwifery, and

[1] Read before the Medical and Chirurgical Faculty of Maryland, April, 1893.

his name will go down with that of Lister as one of the great benefactors of mankind. At present, so great is the admiration in which he is held that steps have recently been taken to raise an international fund for building a monument in his honor in Budapest, his birthplace.

With the advances in bacteriology, and the increasing knowledge of the relations which micro-organisms bear to suppuration and septic disturbances, it has gradually been established that the puerpeal affections do not represent a class of diseases *sui generis*, but are identical with the affections which follow the infection of wounds in other parts of the body, and are due to the same micro-organisms; in other words, puerperal infection is wound infection.

By a long series of observations it has gradually been established that most of the fatal cases of puerperal disease have been due to infection with the streptococcus pyogenes. Before the employment of cultural methods for isolating micro-organisms various observers found chains of micrococci in the tissues of various organs of women dead of puerperal fever. Mayrhofer,[35] in 1865, was the first to publish such an observation, and was rapidly followed by others, among whom may be mentioned Rindfleisch,[43] Coze and Feltz,[9] Recklinghausen, [42] Waldeyer,[51] Klebs,[29] Orth,[39] Heiberg,[22] Landau,[32] Spillman,[47] Doléris,[14] and others.

Pasteur,[41] in 1880, was the first to cultivate the streptococcus from the organs of women dead of puerperal fever. Similar results were likewise obtained by Fränkel,[18] Iovanovic,[24] Lomer,[34] Winckel,[54] Bumm,[5] Döderlein,[11] Winter,[55] Ott,[40] Czerniewski,[10] Widal,[53] and others, so that at present there can be no doubt that the streptococcus pyogenes stands in a causal relation to a very large proportion of the fatal cases of puerperal disease. One of the most convincing articles upon this subject was written by Widal,[53] who found streptococci in nearly every case in which he performed an autopsy, and who was able to demonstrate that the most divergent forms of puerperal affections, as puerperal ulcers, endometritis, parametritis, peritonitis, septicæmia, pyæmia, and even phlegmasia alba dolens, could all be traced to the same cause; namely, streptococcus infection.

Streptococci are not, however, always the sole cause of puerperal diseases, for, just as various other organisms may lead to wound infection and sepsis in other portions of the body, so may they also give rise to puerperal wound infection.

Thus, Brieger[4] was the first to show that the staphylococcus might cause fatal puerperal fever, and his statements were soon verified by Czerniewski,[10] Fehling,[15] Hägler,[21] Döderlein,[12] and others. Staphylococci do not, however, frequently cause the more severe forms of the disease, but it is generally admitted that they frequently give rise to mild cases, as was first pointed out by Hägler,[21] an assistant to Fehling.

Not infrequently staphylococci are combined with streptococci in

these affections. Döderlein[12] reported a small epidemic, which occurred in Leipzig in 1887, which was due to a combination of these two forms of organisms.

In a certain number of cases the organisms of putrefaction are supposed to play a part in the production of puerperal affections, not so much by their action as pus-producers as by the absorption of poisonous ptomaïnes, which are the result of their life processes. This is the class of cases which Matthews Duncan designated as sapræmia, and with which most of us consider ourselves familiar.

To us, however, it is doubtful whether they are of as frequent occurrence as is generally supposed, and we do not hesitate to believe that a considerable number of the so-called cases of sapræmia are not due to the putrefactive organisms at all, but are the result of slight infection with the ordinary pus producing organisms. We are strengthened in this belief by the statement of Bumm[7] (1891), who found streptococci lacking in only three out of eleven cases, which appeared clinically to be typical cases of putrid endometritis. And very lately (1893), Von Franque,[19] in a clinically typical case of sapræmia, found only a pure culture of streptococci in the retained lochia. Supported by several similar observations, he concludes his article with the following sentence: "The occurrence of sapræmia in the puerperium is rare; it should only be diagnosed when an accurate bacteriological examination of the lochia demonstrates the absence of pathogenic and the presence of saprophytic organisms."

We do not desire to be understood as stating that there is no such thing as sapræmia; for as yet we are unable to express a positive opinion upon the subject.

Gonococci are occasionally the cause of some of the milder cases of puerperal disease. For years this has been a favorite theory with Sänger and many others, and within the last few months it has been clearly demonstrated that such may be the case. For in the *Centralblatt für Gynäkologie* of February 25, 1893, Krönig[30] makes a preliminary communication on "Gonorrhœa in Wochenbett," in which he states that he has obtained a pure culture of the gonococcus from the interior of the uterus, in nine cases in which there were slight febrile disturbances during the puerperium. He further states that all the cases recovered without treatment. There can be no doubt as to the correctness of Krönig's[30] statements, for he is an assistant in the Gynecological Clinic at Leipzig, and no doubt his work was done under the supervision of Döderlein, who is an expert bacteriologist as well as obstetrician.

Von Franque,[19] in his recent article, reports a case of puerperal infection of moderate severity, in which he found a pure culture of the colon bacillus in the uterus, unaccompanied by any other organism.

That the organism was virulent was shown by the fact that the pure culture readily killed guinea-pigs and rabbits.

As far as we can learn, this is the first instance in which the colon bacillus has been said to be the cause of puerperal infection; but when we consider the proximity of the genital tract to the rectum, where colon bacilli abound, we should not be surprised at Von Franque's find; but rather that the same organisms have not been found in the uterus in other cases.

That still other organisms may occasionally lead to puerperal infection is extremely probable. Kuliscioff[31] states that he believes that eventually the bacillus proteus will be considered as a cause for puerperal infection. His statements, however, have not yet been verified; but we are quite prepared to believe that the bacillus proteus may give rise to these troubles; for we have seen a case of fatal peritonitis (Flexner[17]), as well as an ovarian abscess caused by it.

That still other organisms may play a part in these processes is rendered quite likely by the statement of Witte,[56] who has isolated five varieties of bacilli from the vagina, all of which are found to be pathogenic for rabbits.

Very lately (April 6, 1893), in a fatal case of puerperal tetanus, Heyse[23] has succeeded in demonstrating tetanus bacilli in the cervical secretion obtained during life. In this case forceps had been employed and the placenta extracted manually. The demonstration of tetanus bacilli in the dust obtained from the cracks between the boards of the floor of the room in which the woman had been delivered, renders it most probable that the woman was infected by the accoucheur.

Heyse's case is very thoroughly worked out and is of great interest in connection with the facts already adduced.

To resume. We will state that scientific proof has been adduced which demonstrates that puerperal infection may be due to the invasion of the wounds of the genital tract by the streptococcus pyogenes, the staphylococcus aureus and albus, the gonococcus, and the colon bacillus. It is quite probable that some of the putrefactive organisms play an important part in the production of sapræmia, and it is possible that the bacillus proteus, and perhaps other organisms, may be capable of giving rise to puerperal infection.

Thus we see that various, very diverse micro-organisms, especially the streptococcus and staphylococcus, may give rise to puerperal infection, and that the organisms concerned are identical with those connected with the usual forms of wound infection. (See Welch: "Conditions Underlying the Infection of Wounds," THE AMER. JOURN. OF THE MED. SCIENCES, November, 1891.)

We have thus briefly indicated the various organisms which may be concerned in puerperal wound infection, and at the present time no one

will deny that in the vast majority of cases the offending micro-organisms are brought to the woman from without by hands or instruments which are introduced into her genital tract; in other words, that we have to deal with direct wound infection, just as well as the surgeon.

Semmelweiss[45] recognized this fact nearly forty years ago, when he said: "The decomposed organic-animal material which causes childbed fever when absorbed, in the vast majority of cases is brought to the individual from without. These are the cases which represent the epidemics of childbed fever; these are the cases which can be prevented." And at the present day the only change which one could make in Semmelweiss' statement would be to substitute the words pathogenic micro-organisms for "decomposed organic-animal material."

The question now presents itself: Is external infection the only cause of puerperal infection? Must the obstetrician attribute every case of puerperal infection to the effect of organisms, which he himself has introduced into the woman's genital tract? Or can he say in a certain number of cases that the infection is due to no fault on his part, but rather to conditions which existed within the genital tract prior to his examination?

In other words, is there such a thing as auto-infection?

Semmelweiss[45] said there was, in the following sentence: "In rare cases the decomposed organic-animal material which causes childbed fever when absorbed, is produced within the borders of the affected organism; these are cases of auto-infection and cannot all be prevented."

We now know that all wound infections are due to micro-organisms, which must be introduced from without, for they cannot originate independently within the body; consequently auto-infection, as conceived by Semmelweiss,[46] cannot exist.

In the first flood of the rigid antiseptic era, the possibility of auto-infection was generally denied, and for a time all puerperal troubles were attributed to external infection. This state of affairs continued for some time, but gradually obstetricians found, in spite of what they considered most rigid antiseptic precautions, that they did not have ideal puerperia, and that puerperal fever was not absolutely abolished, and although they treated the lying-in woman as they would a severe surgical case, they did not have so good results as the surgeons.

To explain the difference between the ideal puerperium and the imperfect results attained, Ahlfeld,[1] of Marburg, rehabilitated the auto-infection idea. He took the most extreme views as to the frequency of auto-infection and included under that term many cases in which there could be no reasonable doubt of external infection.

Ever since then the subject has been constantly before the obstetrical world, and all varieties of arguments have been advanced both for and against it, and considerable temper not infrequently displayed.

The fact of the matter is that the term auto-infection is an unhappy one, and the entire discussion has been one more of words than facts; for neither side has been able to give a perfectly clear definition of what they mean by the term, and consequently, in any discussion, the opposing sides have no common ground upon which to stand.

The question as to the possibility of auto-infection, accordingly, resolves itself simply into a consideration of the definition of the term.

From what has been said above there can be no hesitation in denying the possibility of auto-infection as conceived by Semmelweiss.[45]

On the other hand, it is quite possible that pathogenic organisms may exist in the genital tract during pregnancy without giving rise to any symptoms whatever, and only exert their influence during labor or the puerperium, when the wounds which follow labor will afford abundant opportunity for their absorption. This, of course, is only a variety of external infection, the only difference between it and the usual form of contact infection being the length of time that the offending microorganisms have been in the genital tract; in other words, we have to deal with direct and indirect infection. Thus, for example, admitting that the vagina may contain pathogenic organisms, it is conceivable that they may lead to infection, without any further introduction of organisms from without.

This is practically the definition given by Kaltenbach [25] at the German Gynecological Society in 1888, and is what we understand by the term auto-infection.

Regarded from this standpoint, therefore, the possibility of auto-infection must stand or fall with the demonstration of pathogenic organisms within the genital tract of pregnant women who have not been examined. Can it be shown that pathogenic organisms are present under these conditions?

Kehrer,[26] Karewski,[27] and others of the earlier observers stated that the lochia of healthy women always contained substances which were capable of producing suppuration when injected into animals, and also that their virulence increased with the length of time after the labor.

From this they concluded that it was always possible for a woman to be infected from her own lochia, and the only reason that it did not occur more frequently was that the wounds resulting from the labor had healed before the lochia had time to attain their greatest virulence. This work was done without the most approved aseptic precautions, and is therefore of practically no value.

As the methods of bacteriological research became more perfected, a number of investigators busied themselves with this question, and at first their results were very contradictory.

Gönner[20] (1887) examined the vaginal and cervical secretions from 31 healthy women, and found pathogenic organisms in none of them; he

accordingly stated that in healthy women the vagina contained large quantities of non-pathogenic organisms, from which, however, there was absolutely no danger of auto-infection.

He was soon followed by Döderlein,[11] who obtained the lochia directly from the uterus, and found in non-febrile cases that they were free from micro-organisms; while in febrile cases they contained large quantities of organisms, usually streptococci; the vagina always containing numberless germs of the most various species.

The next year (1888) Winter[55] examined the uterine secretions in non-pregnant women, and concluded that they were free from micro-organisms, but that the vagina and cervix contained many varieties. In one-half of his cases he found the staphylococcus albus in the vagina; in all, he cultivated twenty-seven different varieties of organisms from the vaginal secretion, including all varieties of strepto- and staphylococci. His work substantiated that of Döderlein,[11] and both agreed that the character of the vaginal secretion afforded abundant opportunity for auto-infection.

Ott[40] was likewise able to confirm the statements of Döderlein[11] and Winter[55] as to the absence of organisms from the interior of the uterus; but he also stated that in healthy puerpera the lochia from the upper portions of the vagina were free from organisms, and consequently could not offer an opportunity for auto-infection. In fever cases, on the contrary, he found various organisms in the lochia whether obtained from the uterus or vagina.

Czerniewski[10] examined the uterine lochia from 57 lying-in women with, and 77 without fever. In only one woman without fever could he find organisms in the uterus; while in all the fever cases he found large quantities of organisms, principally streptococci, most of which were proved to be virulent.

It is evident, from the work to which we have just referred, that all the investigators in this field agree in stating that the interior of the uterus in healthy women, whether in the normal or puerperal state, is absolutely free from micro-organisms; while in febrile puerperal cases they are always present and are usually streptococci. Work by Strauss and Sanchez-Toledo,[49] upon the lower animals, has also demonstrated that the healthy uterus is absolutely free from micro-organisms.

On the other hand, the great majority of investigators agree that the vaginal secretion frequently contains pathogenic organisms, but a few, as Gönner,[20] Thomen,[50] and Samschin,[44] state that they have been unable to find pus-producing organisms in it. To their statements are opposed the work of Winter,[55] Döderlein,[11] Widal,[53] Steffeck,[48] Witte,[56] and Burguburu,[8] who have found pathogenic organisms in a larger or smaller proportion of the cases examined by them.

Steffeck,[48] who is one of the most pronounced auto-infectionists, ex-

amined the vaginal secretions from 29 pregnant women, and found that 41 per cent. of them contained pus-producing organisms, as was proved by inoculation experiments upon animals. From this he concludes that the possibility of auto-infection is clearly demonstrated, and, in consequence, advocates most thorough disinfection of the vagina to guard against its occurrence.

It is thus seen that the results of the various observers stand out in marked contrast to each other; the one side apparently proving that auto-infection is impossible, and the other that it has abundant proof in its favor.

How can these differences in apparently good work be reconciled?—for it is hardly possible that either side is absolutely in the wrong.

The explanation of these apparently contradictory results was furnished in 1892 by Döderlein,[13] in his work on the *Vaginal Secretion*. Basing his work upon the consideration of 195 cases, he was able to show that a marked difference exists in the vaginal secretion in different cases, and was able to distinguish two varieties of vaginal secretion, namely, normal and pathological.

He states that the normal vaginal secretion is a whitish material of the consistency of clotted milk, and always has a strongly acid reaction. Under the microscope, it contains almost exclusively a long bacillus, a few epithelial cells and occasionally a few yeast cells.

The pathological secretion, on the other hand, generally has a yellowish or yellowish-green color, is of a creamy consistency, and often contains small gas bubbles or masses of tenacious mucus. Its reaction is usually weakly acid, and not infrequently neutral or alkaline. Under the microscope, this pathological secretion is immediately seen to be different from the normal; it contains large quantities of various kinds of micro-organisms, bacilli as well as cocci, and considerable quantities of leucocytes and epithelial cells. Generally a single glance through the microscope is sufficient to distinguish between the two varieties of secretion.

Of his 195 cases, 55.3 per cent. presented normal, and 44.6 per cent. pathological vaginal secretion.

He found that the bacillus of the normal vaginal secretion is a long, slender bacillus, which has peculiar modes of growth and produces an acid allied with lactic acid, to which is due the normal acidity of the vagina. He also found that it was non-pathogenic, and large amounts of it might be injected into animals with impunity. He accordingly concludes that the normal vaginal secretion presents absolutely no possibility for auto-infection; but rather appears to be inimical to the pus-producing organisms; for small quantities of them, when introduced into a vagina with normal secretion, are rapidly killed.

On the other hand, he showed that the pathogenic vaginal secretion

did afford an opportunity for auto-infection; for, in 10 per cent. of the pathological cases he found the streptococcus pyogenes, which was demonstrated by inoculation experiments to be pathogenic in more than one-half of the cases.

In the light of Döderlein's[13] work, the divergent results of the various investigators are readily explained by supposing that those who obtained negative results happened to experiment with normal vaginal secretions; while the other observers met with both kinds of secretions.

Through the courtesy of Prof. Michel, who has kindly allowed us to make use of his material at the University of Maryland, we have been able to substantiate to a certain degree the interesting work of Döderlein.[13] So far we have only had opportunity to examine the vaginal secretion from 15 pregnant women who had not been previously examined. Of course, it is impossible to draw numerical conclusions from so small a number of cases, and all we can say is that our work has clearly demonstrated that Döderlein's distinction between normal and pathological vaginal secretions is certainly justified.

We will now give a very short account of the results of our investigations, reserving the purely technical portions of the work for a later publication, when we hope to be able to report our results based upon a considerable number of cases. We obtained the vaginal secretion from pregnant women, who had not been examined previously, by means of a cylindrical glass speculum, which had been sterilized by steam, and removed portions of secretion from the posterior cul-de-sac of the vagina, with the usual precautions, by means of a platinum loop. The secretion was first tested as to its reaction, then cover-glass preparations were made, and lastly various culture media were inoculated.

In 4 cases we found the secretion to correspond exactly to Döderlein's[13] normal secretion, being intensely acid and containing a pure culture of the vaginal bacillus, occasionally with a few yeast cells.

In 2 cases we found the vaginal bacilli and unidentified cocci.

In 1 case we were unable to obtain any growth upon our media, and in 8 cases we found various organisms which correspond to the usual pus-producing organisms—usually, associated with other organisms. Thus, we found the streptococcus in 2 cases, streptococcus and staphylococcus aureus in 1 case, staphylococcus aureus in 1 case, staphylococcus albus in 3 cases, and staphylococcus epidermidis albus in 1 case.

Thus it is seen that in 8 cases we have found in the vaginæ of non-examined pregnant women organisms which correspond in every particular to the ordinary forms of pus-producing organisms, and among them the streptococcus has occurred three times. In nearly all of the cases the reaction of the secretion was altered, but especially in the three in which streptococci were found. In one of these cases it was neutral, and in the other two very slightly acid.

Inoculation experiments upon rabbits, with pure cultures of the streptococci, gave negative results; but, in spite of that, we believe that we have had to do with pus-producing organisms; for it is well known what very inconstant results follow their inoculation into rabbits.

Our results, combined with the positive results of Burguburu,[8] Döderlein,[13] Steffeck,[48] Winter,[55] and others, make it perfectly clear that pathogenic organisms are frequently found in the genital tract of women who have not been examined, and consequently prove beyond all question that auto-infection is perfectly possible.

Having thus shown that auto-infection is a possibility, it is of the greatest importance to decide how often it occurs, and whether we must reckon with it in our daily obstetrical work.

It is evident that its frequency can only be determined by reliable statistics; for it is readily seen that if pathogenic organisms occur in the vagina in 41 per cent. of all cases, as stated by Steffeck,[48] and their presence be all that is necessary for the production of auto-infection, the human race should long since have been destroyed. It is evident that other conditions beside the presence of pathogenic organisms within the vagina must be necessary for the production of auto-infection. Just what conditions are necessary we are at present, unfortunately, unable to state.

Ahlfeld,[2] Kaltenbach,[26] and others of the more radical school of auto-infectionists, believe that auto-infection occurs very frequently, and, as we have indicated above, include under that head many cases which are undoubtedly due to external infection. Such being the case, their estimate of its frequency would be misleading. On the other hand, there is a considerable number of obstetricians who hardly believe in its existence. For example, Slavjansky,[46] in preparing his article upon "Obstetrical Antisepsis," for the International Medical Congress, at Berlin, in 1890, wrote to the directors of fifty-two lying-in institutions in Russia, and, among other questions, asked how often auto-infection occurred. All of the answers were in the negative, except one from the University of Dorpat, where one case had been observed. This, no doubt, represents an exaggeration upon the other side of the question, and it appears to us that the question of the frequency of such affections is best answered by the statistics of those who do not employ vaginal douches, and rely upon subjective antisepsis and thorough cleansing of the external genitals, or those who can present a series of cases in which the women were neither douched nor examined internally. Such statistics have been presented lately by Mermann[38] and Leopold,[33] and we will now briefly consider their results.

In March of this year, Mermann[38] reported a series of 900 labors, in which only subjective antisepsis was employed, the vagina not being douched even in operative cases. He has included among his fever cases

all rises of temperature above 100° F., even those due to extra-genital causes; and as his experience, and that of his assistants, has increased in subjective antisepsis, his morbidity has gradually fallen from 21 to 6 per cent. His cases are frequently examined, and still his results are excellent. He justly says that the difference between 21 and 6 per cent. is due entirely to increased experience in subjective antisepsis, and that no one should think of attributing any of the 15 per cent. difference between 21 and 6 per cent. to auto-infection. Among the 6 per cent. are included all rises of temperature, even those cases which entered the institution already infected, and those in which the rise of temperature was not due to genital affections. With these results, he asks, is there any room for auto-infection?

During the past five years, Leopold,[33] of Dresden, has devoted a great deal of attention to the subject of fever in the puerperium. Previous to 1889 he employed prophylactic vaginal douches in all cases; since 1889 he has not used them, except in operative cases, and has found that puerperal infections occur only five-ninths as often without their employment as formerly. He accordingly concludes that prophylactic vaginal douches are not only unnecessary, but in many cases are absolutely harmful. During five years, from 1886 to 1890, he has had 919 labors in which the women were not examined at all; 12 of them had mild attacks of puerperal infection; in 10 the infection could be attributed to other causes, and only in 2, or 0.21 per cent., was it possible to attribute the infection to auto-infection.

When we compare the results of Leopold[33] and Mermann[38] with the known fact that bacteriological research shows that pathogenic organisms are frequently present in the genital tract, it becomes evident that auto-infection cannot play so large a part as we would be inclined to admit from a consideration of the bacteriological work alone.

How can this apparent contradiction of clinical and scientific facts be accounted for? In the first place, our every-day experience teaches us that the presence of pathogenic organisms does not necessarily result in the infection of wounds. This has been demonstrated by Bossowski[3] and others, and more recently by Welch and Howard,[52] who introduced considerable quantities of virulent cultures of the staphylococcus aureus into the fresh blood-clots of wounds antiseptically treated, without producing suppuration.

The same has been noticed in the puerperal uterus; for both Czerniewski[10] and Von Franque[19] have in rare instances obtained streptococci in pure culture from the interior of the uterus in apparently perfectly healthy women.

It appears, then, that beside the presence of micro-organisms, certain conditions, of which we are as yet ignorant, are necessary for the production of infection. It is more than probable that certain products of

bacterial life must accompany the micro-organisms for them to lead to infection, and it is possible that the organisms which grow in the vagina lack these materials, while those which are introduced directly from without possess them.

It is evident to anyone who considers the matter, that abundant opportunity is afforded, even in the cases which are not examined, for the organisms present in the vagina to gain access to the fresh wounds which result from labor, and this opportunity is greatly increased if an examination be made or an instrument or other foreign body be introduced into the genital tract. Of course, the entire mechanism of labor in normal cases is eminently adapted to prevent organisms which are in the vagina or cervix from gaining access to the body of the uterus. For, in the first place, there is the increased secretion which accompanies labor, then the bag of waters ruptures and more or less completely douches out the lower part of the genital tract. This is soon followed by the closely fitting head, after which comes another gush of amniotic fluid and blood, and lastly the placenta comes down, drawing all after it, just as a piston in a pump. This is admirably adapted for cleaning out the genital canal, and appears more suitable, as well as more natural, than any sort of douche which we might give.

From a consideration of the clinical and bacteriological facts here adduced, it is evident, theoretically, that auto-infection should frequently occur, but practically it is of comparatively rare occurrence. In the cases in which the vaginal secretion is normal, there is absolutely no possibility for its occurrence; and in the cases in which the vaginal secretion is pathological, it does not occur nearly so often as one would expect, although conditions which are apparently favorable for its occurrence are frequently present.

Such being the case, we believe that the general practitioner will do best for himself and his patient if he acts as if there were no such thing as auto-infection, and does not attempt to deal with any organisms which may exist within the vagina, and contents himself with the most scrupulous cleanliness on his part and careful disinfection of the external genitals of his patient. As soon as the practitioner admits that auto-infection occurs, his only rational procedure is a prophylactic disinfection of the vagina, with all its disadvantages. And who does not believe that he will do far more harm than good with the douche, and introduce with it far more organisms than he kills or washes away? We can only agree with Mermann,[36 37] who states that it is impossible to disinfect the vagina thoroughly with the means ordinarily at the command of the practising physician, and with the patient in her bed.

This does not apply at all to well-regulated hospital practice, for there the douche may be given with greater antiseptic precautions. But to us it appears that routine vaginal douching, even in hospital work, is

capable of doing more harm than good. The question of prophylactic vaginal douching is, however, still *sub judice*, and at present it would appear ill-advised for us to condemn it unreservedly.

We believe that the best results will be obtained when, in addition to the most rigid subjective antisepsis, we consider each case separately, and make a preliminary microscopic examination of the vaginal secretion. If the secretion be normal there can be no possible justification for the use of the douche, but if it be pathological there may be.

Döderlein [13] states that vaginal injections of 1 per cent. lactic acid will frequently convert pathological into normal secretions within a few days. We have not tested this ourselves, but feel that it should be tried if possible. When there is not sufficient time for the lactic acid injections, or if they fail to accomplish the desired end, we should resort to the prophylactic sublimate douche. This applies to hospital practice, but we repeat once more that the conception of auto-infection is dangerous for private practice, and will lead either to neglect of subjective antisepsis or to the prophylactic douche and all the consequences of meddlesome midwifery.

Bibliography.

1. *Alhfeld:* Beiträge zur Lehre von Resorptionsfieber im Wochenbett und von der Selbstinfektion. Berichte und Arbeiten, 1883, i. 165.
2. —— Beitrag zur Lehre der Selbstinfektion. Cent. f. Gyn., 1887, 729.
3. *Bossowski:* Wiener med. Wochenschrift, 1887, Nr. 8 u. 9.
4. *Brieger:* Ueber bacteriologische Untersuchungen bei einigen Fällen von Puerperalfieber. Charité Annalen, 1888, xiii. 198.
5. *Bumm:* Die puerperale Wundinfektion. Centralbl. f Bakteriologie, 1887, ii. 343.
6. —— Ueber die Aufgaben weiterer Forschungen auf dem Gebiete der puerperalen Wundinfektionen. Arch. f. Gyn., 1889, xxxiv. 325.
7. —— Histologische Untersuchungen über die puerperale Endometritis. Arch. f. Gyn., 1891, xl. 398.
8. *Burguburu:* Zur Bacteriologie des Vaginalsekretes Schwangerer. Arch. f. exp. Path. u. Pharmak., xxx., Nov. 1892.
9. *Coze u. Feltz;* Gazette méd. de Strassburg, 1869, p. 30.
10. *Czerniewski:* Zur Frage von den puerperalen Erkrankungen. Eine bacterioscopische Studie. Arch. f. Gyn., xxxiii. 73, 1888.
11. *Döderlein;* Untersuchungen über das Vorkommen von Spaltpilzen in den Lochien des Uterus und der Vagina gesunder und kranker Wöchnerinnen. Arch. f. Gyn., 1887, xxxi. 412.
12. —— Klinisches und Bakteriologisches über eine Puerperalfieberepidemie. Arch. f. Gyn., 1891, xl 99.
13. —— Das Scheidensekret. Leipzig, 1892.
14. *Doléris:* La Fièvre puerpérale. Paris, 1880.
15. *Fehling:* Ueber Selbstinfektion. Verhand. Deutsche Ges. f. Gyn., Freiburg, 1889.
16. —— Physiologie und Pathologie des Wochenbetts. Stuttgart, 1890.
17. *Flexner:* Peritonitis due to the Bacillus Proteus. Bulletin of the Johns Hopkins Hospital, 1893, p. 12.
18. *Fränkel:* Quoted by Lomer.
19. *von Franque:* Bacteriologische Untersuchungen bei normalem und fieberhaften Wochenbett. Zeit. f. Geb. u. Gyn., 1893, xxv. 277.
20. *Gönner:* Ueber Mikroörganismen im Sekret der weiblichen Genitalien während der Schwangerschaft und bei puerperalen Erkrankungen. Centralbl. f. Gyn., 1887, 444.
21. *Hägler:* Quoted by Fehling, Phys. u. Path. des Wochenbetts. Stuttgart, 1890.
22. *Heiberg:* Die puerperalen und pyämischen Processe. 1873.
23. *Heyse:* Ueber Tetanus Puerperalis. Deutsche med. Wochenschrift, April 6, 1893, No. 14, p. 318.

24. *Iovanovic:* Referred to by Lomer.
25. *Kaltenbach:* Ueber Selbstinfektion. Ver. d. Deutschen Ges. f. Gyn., Freiburg, 1889.
26. —— Zur Antisepsis in der Geburtshülfe. Volkmann's Sammlung klin. Vorträge, No. 295.
27. *Kareweki:* Experimentelle Untersuchungen über die Einwirkungen puerperaler Sekrete auf dem thierischen Organismus. Zeit. f. Geb. u. Gyn., 1882, vii. 331.
28. *Kehrer:* Wirkung der Lochien auf lebende Gewebe. Müller's Handbuch der Geburtshülfe, 1888, i. 545.
29. *Klebs:* Archiv f. exp. Path., Bd. v. 417.
30. *Krönig:* Vorläufige Mittheilung über Gonorrhœa im Wochenbett. Centralbl. f. Gyn., 1893, 157.
31. *Kulisciоff:* Gazetta degli Ospitali, 1886, No. 77. Quoted by Eisenberg, Centr. f. Bakt., 1888, iii. 373.
32. *Landau:* Ueber puerperale Erkrankungen. Archiv f. Gyn., 1874, vi. 147.
33. *Leopold und Goldberg:* Ueber die Entbehrlichkeit der Scheiden-Ausspülungen und Auswaschungen bei regelmässigen Geburten und über die grösstmögliche Verwerthung der äusseren Untersuchung in der Geburtshülfe. Archiv f. Gyn., 1891, xl. 439.
34. *Lomer:* Ueber den heutigen Stand der Lehre von der Infektionsträgern bei Puerperalfieber. Zeit. f. Geb. u. Gyn., 1884, x. 366.
35. *Mayrhofer:* Zur Frage nach der Aetiologie der Puerperalprocesse. Monatssch. f. Geburtskunde, 1865, xv. 112.
36. *Mermann:* Zur Antisepsis in der Geburtshülfe. Centr. f. Gyn., 1887, 539.
37. —— Ueber die Entbehrlichkeit und Gefahren innerer Desinfektion bei normalen Geburten. Verh. d. Deutschen Ges. f. Gyn., Freiburg, 1889.
38. —— Fünfter Bericht über 200 Geburten ohne innere Desinfektion. Centr. f. Gyn., 1893, 177.
39. *Orth:* Virchow's Archiv, lviii. 441.
40. *Ott:* Zur Bacteriologie der Lochien. Archiv f. Gyn., 1888, xxxii. 436.
41. *Pasteur:* Comptes-rendus des Séances de l'Acad., 1880, 1038.
42. *Recklinghausen:* Centralbl. für med. Wissenschaften, 1871, 713.
43. *Rindfleisch:* Lehrbuch, 1. Aufl., 204.
44. *Samschin:* Ueber das Vorkommen von Eiterstaphylococcen in den Genitalien von gesunder Frauen. Deutsche med. Wochenschrift, 1890, 332.
45. *Semmelweiss:* Aetiologie, Begriff, und Prophylaxis des Kindbettfiebers. Pest, Wien, und Leipzig, 1861.
46. *Slavjansky:* Die Antiseptik in der Geburtshülfe, Verh. X. internat. med. Congresses, 1891, Bd. iii. Abth. vii. p. 1.
47. *Spillman:* Zeit. f. klin. Med., 1880, 408.
48. *Steffeck:* Bacteriologische Begründung der Selbstinfektion. Zeit. f. Geb. u. Gyn., 1890, xx. 339.
49. *Strauss et Sanchez-Toledo:* Septicæmie puerperale experimentale. Nouv. Arch. d'Obstét. et de Gyn., 1889, iv. 277.
50. *Thomen:* Bacteriologische Untersuchungen normaler Lochien und der Vagina und Cervix Schwangerer. Arch. f. Gyn., 1889, xxxvi. 231.
51. *Waldeyer:* Ueber das Vorkommen von Bakterien bei der diphtheritischen Form des Puerperalfiebers. Arch. f. Gyn., 1872, iii. 293.
52. *Welch:* The Conditions Underlying the Infection of Wounds. Amer. Journ. Med. Sci., Nov. 1891.
53. *Widal:* Infection puerperale et phlegmasia alba dolens. Gaz. des Hôpitaux, 1889, 565.
54. *Winckel:* Zur Lehre von dem internen puerperalen Erysipel. Verh. d. Deutschen Ges. f. Gyn., 1886, 78.
55. *Winter:* Die Mikroörganismen im Genitalkanal der gesunden Frau. Zeit. f. Geb. u. Gyn., 1888, xiv. 443.
56. *Witte:* Bacteriologische Untersuchungsbefunde bei path. Zuständen im weibl. Genitalapparat, mit besonderer Berücksichtigung der Eitererreger. Zeit. f. Geb. u. Gyn., 1892, xxv. 8.

SIMPLE IDIOPATHIC MUSCULAR ATROPHY BEGINNING IN THE FLEXORS OF THE HIPS—BUZZARD'S FORM.

By Howell T. Pershing, M.Sc., M.D.,
LECTURER ON MENTAL AND NERVOUS DISEASES IN THE UNIVERSITY OF DENVER; PHYSICIAN TO ST. LUKE'S HOSPITAL; NEUROLOGIST TO ST. JOSEPH'S HOSPITAL AND ST. ANTHONY'S HOSPITAL; ALTERNATE NEUROLOGIST TO THE ARAPAHOE COUNTY HOSPITAL.

Objection has been made to the multiplication of types of muscular atrophy distinguished, not by difference of kind, but merely by the place of onset and the spread of the disease. Undoubtedly, it is of the first importance to distinguish between the three different kinds of atrophy, but further subdivision, according to the location of the disease, is of great importance as an aid to diagnosis.

Dr. Thomas Buzzard,[1] in his presidential address before the Neurological Society of London, in January, 1890, described a new form of paraplegia, beginning in the iliaco-psoas muscles. He gives brief notes of four cases, in each of which the principal symptom was weakness of flexion of the hips, involving a corresponding difficulty in the execution of such movements as placing the foot upon a chair, mounting stairs, or stepping over an obstacle. In two of the patients, one male and one female, the paralysis was confined to flexion of the hips, and was not influenced by treatment. In another female patient the knee-jerks were very feeble, and extension of the knee was weak. The Weir Mitchell treatment restored the knee-jerks and extension of the knee, but flexion of the hips was not restored. The fourth patient, also a female, suffered an extension of the paralysis to all the muscles of the lower limbs. This patient had two sisters suffering from toe-drop, and in the anterior tibial muscles of one of them there was complete loss of faradic reaction.

Taking the hint from the hereditary predisposition in this family, and the electrical changes in the muscles, Dr. Buzzard regards this form of paraplegia as due to simple idiopathic muscular atrophy beginning in the iliaco-psoas muscles, and considers it especially as being liable to be mistaken for hysteria.

In reporting a case of the same kind I must confess that, although warned by a previous reading of Dr. Buzzard's address, I supposed it was a case of hysteria until the electrical reactions proved the existence of organic disease.

Mrs. E. K., aged forty-seven years. Family history good. Married at thirty-three; widow for past three years. No children; two miscarriages. No history of venereal disease or excessive use of alcohol. In 1886 there was an eruption of herpes on the left shoulder and inner side

[1] "On the Simulation of Hysteria by Organic Disease," Brain, Spring No., 1890; also published in book form by J. & A. Churchill, London, 1891.

of the left arm. Came to Colorado from England in April, 1891, and was then in robust health; could walk ten miles at a stretch without much fatigue; weighed 135 pounds. In the early summer of 1891 it became difficult to ascend stairs, because of the great effort required to raise the knee so as to put the foot upon the next step. This was the first symptom of disease. Walking on level ground was not interfered with, but it was hard to step over any obstacle in the way. Soon after this she noticed a feeling of weakness in the lumbar region, which seemed to extend round to the thighs and knees. She was now unable to run or to walk fast, even on level ground. She next became unable to rise from a chair without the support of her hands. In attempting to lift anything from the floor she would carefully stoop sidewise and use one hand as a balance. Very recently, turning in bed has been difficult, even the weight of the bedclothes appearing to prevent it. There has been no fibrillary twitching of the weakened muscles, and no pain, except a little between the shoulders and in the lumbar region. Appetite, digestion, and sleep have been good. Bowels and bladder always normal. Weight has increased ten pounds.

Present condition—May, 1892. Appearance of robust health. Grasp, flexion of elbow, and especially extension of elbow, weaker than normal on both sides. Walks fairly well forward or backward, but can only with the greatest difficulty lift either foot more than a few inches from the floor. While sitting cannot, even with the utmost exertion, place one knee over the other without lowering the under one. When kneeling, she cannot rise without grasping some support. Before rising from a chair she carefully takes the most favorable posture, and then rises by pushing with her hands upon the thighs. In the lower limbs faradic reactions are greatly diminished, though for the most part retained. Knee-jerks barely perceptible without reinforcement; very slight, though distinct, when reinforced. There is no evident atrophy of any of the muscles, but they are covered by an unusual thickness of subcutaneous fat. Sensibility to touch, pain, temperature, and posture perfect. Heart, lungs, and urine normal.

September, 1892. There is a decrease in the strength of the muscles formerly affected, and a new difficulty is complained of in carrying an object in both hands, and especially in placing it upon an elevated shelf. The knee-jerks are absolutely abolished.

Ankle: extension and inversion of fair strength; dorsal flexion and eversion very weak. Knee: extension fair; flexion weak. Hip: extension weak; flexion almost abolished. The right lower limb is a little weaker throughout than the left. Strength is much better retained in the upper than in the lower limbs. The patient can stand on tiptoe and walk without conspicuous toe-drop, but she descends stairs stiffly, with a shock at each step. Ascending stairs is excessively slow and fatiguing. When standing erect there is some lumbar lordosis; a plumb-line from the spine between the shoulders falls two inches behind the heels. The tibialis anticus and common extensor of the toes on each side are wasted. There is no appearance of muscular hypertrophy in any part of the body. Electrical examination of the lower limbs is difficult on account of the thick layer of fat and the pain caused by the high currents necessary. The accompanying table gives the main results, most of which have been verified by repeated tests. The weakest galvanic current producing a contraction is given for each muscle. The

faradic irritability is rated according to the current required to produce a minimal contraction, not according to the actual strength of the contraction, which, in most muscles, is very slight even with the strongest currents available.

Symbols used: Ma, milliampères; KClC, kathodal closure contraction; AnClC, anodal closure contraction; AnCl—, anodal closure, no contraction.

	Galvanic reaction.	Faradic reaction.
Gastrocnemius, right,	9Ma, KClC very slight, barely greater than AnClC; 15Ma, KClC > AnClC, both weak and sluggish.	Much diminished.
Gastrocnemius, left,	10Ma, KClC, AnCl —; 12Ma, KClC > AnClC.	Much diminished.
Tibialis ant., right,	15Ma, KClC, AnCl —.	Barely perceptible.
" " left,	19Ma, KClC > AnClC.	Much diminished.
Ext. comm. digit., right,	9Ma, KClC = AnClC.	Diminished.
" " " left,	10Ma, KClC = AnClC.	"
Peroneus longus, right,	10Ma, KClC, AnCl —.	"
" " left,	10Ma, KClC = AnClC.	Much diminished.
Biceps fem., right,	20Ma, KCl — AnCl —.	None obtained.
Semitendinosus, right,	18Ma, KClC, AnCl —.	Much diminished.
" left,	18Ma, KClC, AnCl —. 20Ma, KClC > AnClC.	" "
Rectus fem., right,	20Ma, KClC = AnClC.	Barely perceptible.
" " left,	20Ma, KClC, AnCl—.	None obtained.
Biceps brach., left,	7Ma, KClC, AnCl —. 9Ma, KClC > AnClC.	Slightly diminished.
Triceps, left,	8Ma, KClC, AnCl —.	

In both arms all the muscles reacted to faradic currents of moderate strength. The extensors of the fingers required the strongest currents; the intrinsic hand muscles the weakest. In the lower limbs the faradic reactions were worst in the recti and anterior tibials, and best in the intrinsic muscles of the feet. It will be noticed that no muscle gave the reaction of degeneration or showed any marked predominance of galvanic over faradic irritability. In a few muscles, as well as I could judge of the feeble contractions produced, anodal closure contraction equalled kathodal closure contraction, but it never predominated.

May, 1893. There has been no substantial change, except that the muscles used in raising the arms above the head have grown very weak. The patient thinks that the strychnine and the small doses of arsenic given have increased her command over the other weakened muscles.

The important features of this case are: 1. The onset in the inaccessible iliaco-psoas muscles. 2. Failure of electrical reactions to both currents, without reaction of degeneration. 3. Electrical loss being least in the intrinsic muscles of the hands and feet. 4. The atrophy of the anterior tibial group. 5. Absence of any indication of hypertrophy or of fibrillation. 6. Absence of any manifest hereditary taint. 7. Loss of knee-jerk. 8. Rapid progress of the disease.

The existence of organic disease is made certain by the loss of knee-

jerk, the electrical changes, and the muscular atrophy. No doubt atrophy was widespread, though not easily recognized in most muscles. But had the disease remained limited to the flexors of the hips the distinction from hysteria would have been very difficult. A comparatively slight involvement of the quadriceps would diminish the knee-jerk, and Buzzard makes the important statement that knee-jerk is probably never lost in hysteria, but almost invariably exaggerated.

Neuritis being excluded by the complete absence of sensory loss, the diagnosis is limited by the chronic progressive paralysis, the atrophy, the electrical changes, and the loss of knee-jerk, to one of the forms of muscular atrophy. Here we have to distinguish between spinal, pseudo-hypertrophic, and simple idiopathic atrophy.

The point of onset and the subsequent spread of the paralysis are strongly against a spinal origin. Even the possibility of this case representing a hitherto unrecognized form of spinal atrophy may be fairly excluded, considering the rapid course, by the absence of reaction of degeneration and the failure of galvanic irritability, along with that of faradic irritability, as well as by the absence of fibrillation.

Against pseudo-hypertrophic muscular atrophy we have not only the absence of any appearance of hypertrophy, but also the age and sex of the patient.

This brings us to a diagnosis of simple idiopathic muscular atrophy, with which the condition of the muscles is in entire harmony. It may be urged that this disease begins in youth and affects other members of the same family. Yet it may begin as late as sixty, and isolated cases certainly occur. Against the improbability of one case being exceptional in both these particulars, we must consider the obvious resemblance to Buzzard's cases, in one of which hereditary tendency was manifest.

No doubt this is but a rare form of a rare disease: nevertheless, we should know of its existence. Moreover, experience shows that rare diseases become less rare as soon as they are generally known. We cannot tell, for instance, how many such cases have been classed with hysteria, or simply allowed to pass as puzzling and obscure.

REVIEWS.

A TEXT-BOOK OF PRACTICAL THERAPEUTICS. By HOBART AMORY HARE, M.D., B.Sc., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia; Physician to St. Agnes's Hospital and to the Jefferson Medical College Hospital, etc. Third edition, enlarged and thoroughly revised. Pp. xvii., 696. Philadelphia: Lea Brothers & Co. 1892.

A TEXT-BOOK which reaches its third edition within two years has certainly found favor in the eyes of the medical profession. The present edition contains additional information upon some comparatively recent remedies, introduces several of the newer drugs, adds a list of drugs arranged according to their physiological action, and a list of definitions of the terms used to designate classes of drugs. The opportunity has also been made use of to correct the errors which are inevitable in a work of this character. A striking feature of the book is the alphabetical arrangement of the section devoted to Drugs. While it is undoubtedly true that no one classification would be acceptable to more than a respectable minority of teachers, yet we believe that for a student some classification, imperfect though it may be, is useful, that he may learn the properties of allied drugs and subsequently differentiate them. An attempt to supply this want is made in the list above mentioned, but we fear that the reader may look upon it as a table of contents rather than meriting serious study. The statements to be found in this book are unusually concise, yet occasionally are found some that are indefinite: "Carbonate of ammonium is largely employed by surgeons in the treatment of children after surgical operations." Rarely are there contradictory statements. On page 30 we are told that astringents "act not by coagulation of albumin," but further reading shows that both alum and nitrate of silver (pages 57 and 245) do act in this way, and yet the author classifies these drugs as astringents on page 36. When the word turpentine is used it means oil of turpentine (page 328); yet on page 156 we are told that flexible collodion contains turpentine.

As a result of lack of uniformity in the indexing of drugs, we find bromide of ammonium on pages 61 and 97, and iodide of ammonium, on pages 63 and 199; in the latter instance the dose-limit is not identical. We believe that an adherence to the pharmacopœial name would have prevented this duplication, and would have given an opportunity to group all salts of each metal under one heading, instead of obliging the reader to consult the index. Incompleteness of statement in this section is unusual. In view of the recent literature, we believe that a caution against the administration of castor oil following that of male fern would have been timely, the mention of the use of hydrastis in uterine hemorrhage, of creasote in the form of enteric pills, and of the exhibition of drugs intended for action in the intestines in the same form.

The section devoted to Diseases presents on the whole a satisfactory plan of treatment for each disease or symptom enumerated, and here diseases and symptoms are intermingled. Naturally we find reflected the author's own practice, and that in a very marked degree. We might expect that every drug here mentioned would appear in the section devoted to that subject, so that the student may refer to the description of its properties. Yet under abortion is found viburnum; jambul is mentioned under diabetes mellitus; benzoate of magnesium is recommended in gastric dilatation, but none of these are indexed or described. We had expected to find resorcin mentioned under the head of dyspepsia, the use of menthol as an anti-emetic, the salicylate treatment of pleuritic effusion, and the use of intestinal antiseptics in typhoid fever. A few sections are unsatisfactory, as, for instance, that on tetanus, in which it is stated that the treatment is virtually identical with that of strychnine poisoning, to which the reader is referred under the head of nux vomica. The reference recommends, *inter alia*, the use of the stomach-pump, and draughts of water containing tannic acid, which are manifestly without indication in tetanus. The sections devoted to General Therapeutical Considerations, Remedial Measures other than Drugs, Foods for the Sick, are very satisfactory in scope, and contain much valuable information. The index of Diseases and Remedies, we believe, could have been easily omitted, for practically the same information is contained in the section on Diseases; and further, it reminds one of the usually unsatisfactory therapeutic index. The index of Drugs and Remedial Measures should have been more complete in synonyms; for instance, nitroglycerin alone is found, while glonoin and trinitrin, both mentioned in the text, are omitted.

In the selection of new remedies the author has been conservative; some which apparently have secured a permanent place in therapeutics, as pichi, are omitted. We can be assured that all the remedies found are those whose reputations are already secure. A careful reading of this book gives a high degree of satisfaction; physiology and therapeutics are here brought closely together; a few, and the more probable, theories are offered as the ground for the accepted practice; conciseness is the rule rather than elaboration of detail, and with the exception of several examples of inelegant expression, and use of colloquialisms, the diction is excellent. The criticisms offered are criticisms of detail rather than of method, particularly in the section devoted to diseases, and call for increased editorial work on the future editions. The book has already taken high rank, which we believe to be deserved and likely to be maintained.

R. W. W.

LECTURES ON MENTAL DISEASES: DESIGNED ESPECIALLY FOR MEDICAL STUDENTS AND GENERAL PRACTITIONERS. By HENRY PUTNAM STEARNS, A.M., M.D., Physician Superintendent of the Hartford Retreat; Lecturer on Mental Diseases in Yale University, etc. With illustrations. Philadelphia: P. Blakiston, Son & Co., 1893.

DR. STEARNS' book is pre-eminently clinical. It is written entirely from that standpoint by an author who makes no pretensions to, and gives but little evidence of, pathological interests and acquirement; and

it is addressed especially to medical students and general practitioners. It occupies one extreme of a series of text-books, the other extreme of which is held by the remarkable treatise of Bevan Lewis. It is as different from the latter as day is from night—not an inapt simile, because Stearns' treatise will convey clear light upon elementary clinical facts, especially to the general practitioner; whereas Lewis' profound and learned work would but lead him in the (to him) dark labyrinth of an intricate and but partly-explored pathology. Dr. Stearns' book, in fact, is remarkably deficient in pathology and morbid anatomy. If this is the author's design he has succeeded admirably, and has accordingly written a manual that will be helpful to the physician who merely reads and runs; but that it will be a good book for the student, unless supplemented, is doubtful. We say this, because we think that students need more neuro-pathology than they are getting in many of our schools, or than Dr. Stearns will give them. Moreover, the pathology and morbid anatomy of some of the insanities are subjects now of especially great interest; they should claim the attention of all physicians who think it worth while to purchase and read a treatise on mental diseases. Among these forms are alcoholic and epileptic insanity, general paresis, confusional psychoses especially of toxic origin, delirium grave, acute mania, and brain syphilis. The clinical records of these diseases, we may say, are about complete; their pathology alone offers a comparatively fresh field and a chance for original treatment. Because of its limitations in this field Dr. Stearns' manual will not be of special value to the advanced student or to the expert.

The book is rather lacking also in literary reference and in evidence of the exercise of the critical faculty. This latter is so essential now to a proper understanding of past and contemporary work that its almost complete absence calls for a brief note.

The merits of the book, as we have said, are in the clinical descriptions. The author evidently writes almost entirely from personal observation of his own patients in the Hartford Retreat. This gives his book its own particular stamp of individuality and originality. Its merits, like its faults, are its own, and are doubtless the proper and natural outgrowth of its antecedents and its environment. This is saying much in its favor. The book is the work of a close and wise clinical observer, fresh from his own wards, who writes for the instruction of his own class in a great university. Hence it is the product of a natural growth, and has a reason for its existence. We do not know of any work, unless it be Clouston's, in which there are fresher and more graphic descriptions of the various mental diseases.

In his first chapter, on the "Physical Basis of Thought," Dr. Stearns indulges in some speculation, in which we cannot follow him closely here. He seeks to avoid a frank materialistic explanation of psychic phenomena, and hence, as is always the case with those who do so, is soon involved in a hopeless metaphysical maze. We think the best antidote for this is a study of pathology.

In his classification of the insanities, after a very thoughtful discussion of the subject, Dr. Stearns cuts the dilemma right in half and adopts a system founded in part upon symptoms and in part upon causes. He recognizes that it is too early to say the final word upon the classification of phenomena which are as yet but partially understood. Here pathology must give the final decision.

The author discards the terms "monomania" and "paranoia" for the more exact term "primary delusional insanity." He describes this as a neurosis, either inherited or developed. By thus recognizing the non-hereditary form of the disease he is in close accord with some of the more recent French writers, especially Magnan, who contends, in opposition to the partisans of monomania, that there is a "délire chronique d'évolution systématique," quite distinct from the hereditary psychosis.

Dr. Stearns attributes the peculiar cycle of "folie circulaire" to the exaggerated development of that habit which is common to all brains, namely, a tendency toward reaction. It is the expression, we may say, of a Promethean disease, grafted upon a vicious organization, relentless as fate in its ever-recurring cycles of exaltation and depression. The author, with profound insight, recognizes in this disease the fundamental law of the nerve-cell, in its rhythm of alternate nutrition and discharge, perverted here by some mysterious morbid influence into a fatal alternation of excitement and reaction.

Dr. Stearns does not seem to recognize sepsis as an element in the causation of puerperal insanity. As he has had exceptional opportunities to study this disease (in 175 cases observed by him in the Retreat) it seems to us most remarkable that he does not even mention this as a possible cause. He does not, in fact, give much recognition anywhere in his book to the various septic and other infectious processes as possible causes of mental disease, except in his very excellent chapter on delirium grave. Under this heading he treats of post-febrile and post-operative insanity. We do not doubt that he is right in associating these disorders with delirium grave, which latter disease, we believe, is often the result of some infectious process; and yet, from his own clinical standpoint, it might have seemed better and more helpful to the student to have made a separate chapter on acute confusional insanity, to which class they more properly belong. Puerperal insanity, itself, as we have usually seen it, is more truly a *delirious* than a *maniacal* state.

The proof-reading of the book has not always been carefully done. We note several glaring grammatical errors, as one on page 351.

We think that Dr. Stearns' book will commend itself as a helpful guide to many practitioners; and within the limits which we have pointed out, and which were probably designed by the author, we think it is an excellent work. J. H. L.

A Treatise on Diseases of the Rectum, Anus, and Sigmoid Flexure. By Joseph M. Matthews, M.D., Professor of the Principles and Practice of Surgery in the Kentucky School of Medicine. New York: D. Appleton & Co., 1892.

The work before us is distinctly *not* a compilation. The author has formed his own conclusions from a vast clinical experience, which he has reinforced by a careful study of the opinions of others. He sets forth his views with commendable clearness, and emphasizes his convictions with praiseworthy courage. The style is clear, forcible, and graphic; the text is adorned with some eighty illustrations; and the publishers' portion of the undertaking is most worthily performed.

The introduction is of extreme practical value, treating with gratifying care all of those minute methodic details of position, examination, illumination and instrumentation which do so much to make or mar the success of our diagnosis and treatment. Next comes a luminous outline of rectal anatomy, and then a chapter on the "Symptoms of Constipation, and What It Means."

In Chapter IV. the author maintains the thesis that antiseptics are to be used in rectal surgery, for by so doing we promote the rapidity of healing and lessen the danger of septic infection.

Chapter V. deals with Hemorrhoids. External hemorrhoids, he tells us, are of two kinds, first, of soft livid enlargements near the anus, due to rupture of a vein wall, and not, as is taught, to clot in a cyst or a dilated vein. Second, an enlargement of skin-tags, which pre-existed around the anus, this form never attacking those who have a smooth surface in this region. The first variety is to be treated by excision, not by the old method of incising and pushing out the clot; the second, by excision after tying the base with a ligature.

Internal hemorrhoids are admirably treated of in Chapter VI. Their treatment by injection of carbolic acid he most decidedly condemns, because it may cause death, dangerous hemorrhage, stricture of the rectum, ulcers of the gut, and bad internal fistulæ.

Crushing he has tried and abandoned, on the ground that it gives considerable risk of sepsis.

The clamp and cautery he uses only in selected cases, viz., "where there is a large amount of superfluous skin around the anus, which is embraced in, or goes to make up, a part of the internal hemorrhoid," the excision of which would cause severe bleeding.

Excision by the method of Allingham is regarded as difficult and unsafe.

Dilatation of the sphincter by the method of Verneuil seems to Dr. Matthews to be without merit as a means of absolute cure.

Whitehead's operation for excision of the entire hemorrhoidal plexus, or rather, as it is usually done, of the pile-bearing area, our author regards as "bloody, difficult, and tedious," as liable to permit a large suppurating area of non-union, as offering a premium to secondary hemorrhage, and as suited to but very few particularly aggravated cases.

Matthews is a warm friend of the ligature, and insists that it is the treatment *par excellence*.

Fistula-in-ano receives thorough discussion. The term is properly condemned, as the fistula has anatomically little to do with the anus. In looking for the internal opening, if the surgeon fails to find it, he should push the probe to the depth of the sinus, and with it perforate the bowel. This procedure was long since suggested by Richerand.

Matthews reads a lecture to Gross, Brodie, Fergusson, and others, who oppose operation upon a fistula if phthisis exists. He would always operate in incipient phthisis; generally in rapidly progressive fistula; very rarely if cough is severe. He insists that in phthisis, if cough be not severe, healing is not retarded.

In some cases of fistula we can avoid cutting the sphincter by dilating the sinus with a laminaria tent and dividing its walls with a fistulatome. He does not approve of the ligature; strongly advocates cutting, being careful to find all sinuses, to clip edges, and to cut out the gristly channels, and being sure not to incise the sphincter in two places in

one operation. Lange's operation of excision possesses some points of merit.

The so-called nervous rectum points, in most instances, either to a lesion in the rectum, which a careful search will find, or a lesion in anatomical relation which induces reflex disturbance. The author seems to lose sight of those rectal spasms mentioned by Wood, which are apt to be associated with vaginismus and spasmodic dysmenorrhœa, and of the paroxysmal diarrhœa and paroxysms of rectal pain and tenesmus (crises), which Gowers tells us may be met with in locomotor ataxia. We find considered in order, Neuralgia, Irritable Ulcer or Fissure, Anatomy of the Rectum and the Reflexes, Ulceration, and Non-malignant Stricture.

In the chapter on Cancer we would take issue with the author when he says the term sarcoma means very little. He is not a warm friend of colostomy (it is here called colotomy, but colostomy is the proper term if we mean by it the establishment of a fistula more or less permanent). He thinks, with Jessop, that obstruction can generally be relieved by dilatation and other methods; that colostomy does not prevent pain, and does not prolong life. This view may be due to the fact that he prefers the lumbar operation, which does not completely arrest the feces at the artificial anus. The iliac operation gives a death-rate of only 5 per cent. (*American Text-book of Surgery*), and insures complete physiological rest for the bowel below the opening. Again, in describing iliac colostomy, no mention is made by Matthews of what is undoubtedly the most satisfactory method, that is, the operation by Maydl.

Kraske's operation has not been accorded that fulness of description to which it seems entitled, considering the interest which has been excited by this radical procedure of the distinguished Freiburg surgeon.

A consideration of Disease of the Sigmoid Flexure, Prolapsus Ani, Pruritus Ani, Impacted Feces, Villous Tumor of the Rectum, and Malformations of the Rectum and Anus, close this most valuable book.

We commend this work emphatically, and, although high authorities differ from him on not a few points, we can assert that the author advances no view which he does not believe sustained by examples from his extensive experience, and of the truth of which he is not profoundly convinced.

J. C. Da C.

A Dictionary of Psychological Medicine, giving the Definition, Etymology and Synonyms of the Terms Used in Medical Psychology, with the Symptoms, Treatment, and Pathology of Insanity, and the Law of Lunacy in Great Britain and Ireland. Edited by D. Hack Tuke, M.D., LL.D. In two volumes. Philadelphia: P. Blakiston, Son & Co., 1892.

If any proof were wanting beyond the name of the editor that we had an important work before us, surely the names found among his collaborators would more than justify this opinion. As is stated in the preface, the work is the first of its kind which has been attempted, and it aims at providing information more or less systematic in regard to the definition, etymology, and symptoms of the terms used in medical

psychology, with the symptoms, treatment and pathology of insanity, together with an abstract of the law of lunacy in Great Britain and Ireland.

A brief glance at the pages of the book soon shows that we have here presented not merely a number of short definitions of words, but in reality articles of greater or less length, treating of the various forms of mental disorder and of the most important subjects which fall under psychological medicine. We have, therefore, rather a *system* of psychological medicine before us than a dictionary. At the same time it must be stated that none of the articles are of unwieldy length. In addition, the subject is introduced by two most valuable and interesting general papers: the first, entitled "Historical Sketch of the Insane," embraces a digest of the subject from most ancient to comparatively modern times, and in its pages illustrates no small amount of historical research. It is fitting that it has been written by the editor.

Next follows a very valuable article upon "Philosophy of Mind," which is signed by W. C. Coupland, and is a clear and not too abstruse consideration of the subject. After discussing the method and conditions of psychological inquiry, the various faculties of the mind—sensation, perception, ideation and imagination, memory, thought, feeling, and will—are considered. A brief historical outline closes the chapter.

Among the contributors are distinguished names of England, America, France, Germany, Russia, and Italy. It would seem unfair almost to mention any of them without detailing the entire list; however, we cannot refrain from mentioning such names as Blandford, Lauder Brunton, John B. Chapin, Charcot, Clouston, Victor Horsley, Pierre Marie, E. Mendel, Ludwig Mayer, Mierzejewski, Playfair, Sydney Ringer, George J. Romanes, Savage, Siemerling, Tamburini, and Gilles de la Tourette.

It is impossible from the wealth of material in these volumes to speak of any in detail. Taken together, the various articles upon insanity would form a very complete treatise. The ultra-scientific side of the subject is represented by excellent articles upon the "Anatomy and Functions of the Normal Brain," by Alexander Bruce; upon "Criminal Anthropology," by Havelock Ellis; and upon "Criminal Brains," by Moritz Benedikt.

The medico-legal aspects of insanity are well represented by exhaustive articles on "Criminal Responsibility in the Insane," by W. Orange; "The Law of Evidence, in its Relation to Lunacy," by A. Wood Renton; and by a very practical section on "Medical Experts," by the last-mentioned author.

Not only does the work contain full articles upon insanity and related subjects, but also an enormous number of brief definitions of terms used in neurological and psychological medicine; and these are not all confined to the Latin, Greek, and English terms, but even German and French expressions receive elaborate treatment.

Appended to the work is a valuable bibliography of the subject of insanity, also a list of the psychological societies of the world, and, finally, a list of the various journals upon insanity and allied subjects. In order to facilitate the labor of the reader a very full index, covering 64 pages of finely printed matter, is added, so that various subjects under the most diverse heads are readily found.

The practical value of this book cannot, it seems to us, be overestimated, nor can it be too highly praised. The editor deserves the heartiest congratulations upon the success of this most difficult undertaking. We predict for this book a long life as a work of reference—as a work, indeed, which no alienist or neurologist can afford to be without. F. X. D.

GEOGRAPHICAL PATHOLOGY: AN INQUIRY INTO THE GEOGRAPHICAL DISTRIBUTION OF INFECTIVE AND CLIMATIC DISEASES. BY ANDREW DAVIDSON, M.D., F.R.C.P., etc. New York: D. Appleton & Co., 1892.

THE two volumes which comprise this work comprehend a collection of exhaustive researches upon the vital statistics, climatology, and pathology of the various countries of the globe. We are obliged to confess some surprise at the method of arrangement which the author has adopted, for we expected on opening the book to find malarial fever thoroughly discussed in all its relations to geography in one chapter, typhoid fever in another, and yellow fever in a third, etc. Instead of this, the author writes his descriptions by countries, which, while perhaps more convenient for the geographer, is rather less so for the pathologist, who, to secure a definite idea of the distribution of a disease, must well-nigh read the entire book.

The work is replete with maps, tables, charts and statistics, which are excellent, with the exception of the figures relating to the United States, which are all based upon the census of 1880, thus being not only incorrect, but scarcely giving us a fair showing in comparison with other countries.

As regards the United States, we are told that the death-rate from malaria is higher than in most countries of Europe. The death-rate from typhoid fever is 30.19 per 1000 total deaths as compared with 15.69 per 1000 in England.

Scarlet fever is less fatal than in England, while phthisis is much more so, the proportion being 12,095: 10,159 in 100,000. Next to phthisis, pneumonia is the most fatal disease, the deaths per 100,000 in the United States being 8330, while in England they are only 4724. The article on pneumonia is excellent. The author calls attention to the fact that statistics gleaned from the best sources in the United States are unreliable; and it is really lamentable that, while other countries have accurate means of securing correct figures, our systems of registration are so lax, and some of our diagnosticians so poor (alas that we must admit it!) that our figures can be called "unreliable."

Among the many interesting facts to which our attention is called we mention that leprosy is a widely distributed disease, occurring in nearly all countries, especially along the coasts. It seems to be distinctly on the decline, and generally affects the aborigines rather than the Caucasian race. It is unknown in Australia except among a few Chinese, and was unknown in the Sandwich Islands until 1840, when it is believed to have been introduced by Chinese emigrants. It has now become extremely prevalent, so that about 1 in 60 of the inhabitants suffer from it. In the United States lepra exists among the Scandinavian emigrants

settled in Minnesota, Wisconsin, Iowa, and Nebraska. Fifteen cases have been reported in Charleston, S. C., from 1847 to 1882. The total number of cases is supposed to be 50–100. While so rare in North America, lepra is common among the Indians of Mexico and South America.

While leprosy is on the wane and disappears as the white man spreads his civilization, syphilis takes its place, and plays dreadful havoc among the lower races. The author thinks syphilis unknown in America until brought here by the Europeans, and also shows that the savage races of all countries and the islands of the sea were free from it until sailors began to land there and colonies were founded. A curious fact is that syphilis is uncommon in Australia, a place whose original convict colonies would give us the idea of severe infection.

Cretinism in Switzerland is put down at 1.7 to the 1000 population, and wherever cretinism is common goitre is also common.

Malaria is thoroughly discussed, and we learn that in Rome the deaths are 12.8 per 10,000 population. The least affected parts of the city are the poor quarters, where the land is low and crowding considerable. The oases of the Sahara are extremely malarious.

Yellow fever is described under Cuba, which is regarded as its birthplace and where it is continually endemic. It is carefully compared with the numerous malarial diseases found there.

Care is taken to point out the incorrectness of the theory of an antagonism between phthisis and malaria, and figures are given showing this. Malaria is very common in Italy, but the deaths from phthisis number 23.9 in 10,000 deaths, showing how very common phthisis is.

Asiatic cholera is very thoroughly considered under the description of its ravages in India, its original source, in some parts of which it never disappears for any considerable length of time. From India, in the course of time, it has spread to nearly all countries of the world, indeed the only ones where no record of its existence can be found are Australia, Bermuda, Cape Natal and Zululand, Chile, Falkland Islands, Faröe Islands, Kamschatka and North Siberia, Madagascar, Russia north of 64° N. latitude, the Hebrides, Shetland and Orkney Islands, the west coast of Africa from Sierra Leone southward, St. Helena, Ascension, America north of Canada and south of the Argentine Republic.

The first recorded observation of cholera was in India in 1503.

All the visitations which America has suffered are traceable to infection from Europe. The first epidemic occurred in 1832, and was most severe along the Atlantic coast. In 1848–52 the second great epidemic occurred, and during it no part of the country escaped. The third was in 1854. The fourth was in 1866–67, and was confined almost entirely to the Mississippi Valley. The fifth was in 1873 and again was most severe along the Mississippi.

In Japan cholera became known in 1820, being carried there from China, and caused considerable ravages. In 1858 the U. S. frigate Mississippi introduced cholera to the islands, which spread rapidly and became so virulent that 100,000 persons were carried off in a month. In 1879 it is said to have killed 97,422 victims, and at present it is the disease which commits the greatest ravages in Japan.

The work is a careful compilation, and cannot fail to be of use to the pathologist and scientific physician. Its chief recommendation is the accuracy of its figures and tables, which are mostly selected from army

and governmental reports, and the convenience of numerous small maps so shaded as to show exactly how different areas of territory are affected by diseases. J. McF.

A MANUAL OF THE OPERATIONS OF SURGERY, FOR THE USE OF SENIOR STUDENTS, HOUSE SURGEONS, AND JUNIOR PRACTITIONERS. By JOSEPH BELL, M.D., F.R.C.S. Edin. Edinburgh: Oliver & Boyd, 1892.

THE first edition of Bell's *Manual* was issued over twenty-five years ago, and that a seventh edition is now demanded is proof that it must be a work of sterling merit.

This book contains clear but comprehensive descriptions of the most usual and useful surgical operations, especially those which can be performed on the dead body, and hence, properly undertakes no demonstration of operations for tumors, necrosis, etc.

The first section deals with ligations, the next with amputations. The author attaches great importance to Syme's amputation at the ankle-joint, gives an admirable description of it, and calls attention to the unquestionable fact that many surgical manuals are in error as to its mode of performance, and that most of them vouchsafe so meagre a notice as to render clear comprehension impossible.

It is rather curious that no mention is made of Wyeth's method for the prevention of hemorrhage in hip-joint amputations, which is one of the greatest improvements of modern surgery.

Chapter III. presents the subject of Excision of Joints; Chapter IV., Operations on Cranium and Scalp; Chapter V., on the Eye (revised by W. G. Syme); and then follow descriptions of operations on the nose, lips and face, jaws, mouth and throat, air-passages, thorax, abdomen, pelvis, tendons, and nerves.

This little book is remarkably thorough; the descriptions are accurate to minute details. It is evidently written by a practical surgeon who is also a scientist, and we heartily commend it to all who would acquaint themselves with ordinary surgical procedures.

The book interests us for another reason, for we believe that its author is the person whose marvellous powers of minute observation and logical deduction have been embodied by A. Conan Doyle in his famous character of Sherlock Holmes. J. C. DA C.

THE PRINCIPLES OF THEORETICAL CHEMISTRY, WITH SPECIAL REFERENCE TO THE CONSTITUTION OF CHEMICAL COMPOUNDS. By IRA REMSEN, Professor of Chemistry in the Johns Hopkins University. Fourth edition, thoroughly revised. Philadelphia: Lea Brothers & Co., 1892.

THE fourth edition of Professor Remsen's well-known book comes again enlarged and revised. Favorably commented upon and well received as this classical work appeared at first, each edition has enhanced its value. We may say, without hesitation, that it is to-day a standard work on the theory of chemistry, not excelled and scarcely equalled by any other in any language. Its translation into German and Italian

speaks for its exalted position and the esteem in which it is held by the most prominent chemists.

The clear, logical style of its diction, the proper selection of the labors of others, with the citation of the experimental evidences from which the deductions have been drawn, makes its reading and study a source both of pleasure and instruction.

The chapter on Solutions, newly introduced, with the relations between their vapor pressures and the molecular weights of the dissolved substances, together with the application of the researches of Pfeffer and De Vries on this subject, promises the development of new methods for the determination of molecular weights. Of interest, also, is the reference to the theories of Arrhenius and Claudius as to the probability of salts being decomposed into their *Ions* when dissolved, which are again growing in favor within late years.

It would lead to a review more lengthy than could be acceptable were only some of the most interesting or important features here quoted which are not generally found in literature, but which have been collected by the author and grouped with excellent judgment and commented on in a manner that shows an analytical mind and a facile writer.

We claim for this little work a leading place in the chemical literature of this country. To the scientific physician, whose researches for morbific elements lead him more and more into the study of chemistry, this work will not alone be one from which he may draw a clear conception of chemical matter and its composition, but one also which, after his wading through the labyrinth of empyrical medicine, will both refresh his mind and fit it for pursuit in the direction of rational explanation of the many confusing problems that confront him. L. W.

NOTES ON THE NEWER REMEDIES: THEIR THERAPEUTIC APPLICATIONS AND MODES OF ADMINISTRATION. By DAVID CERNA, M.D., Ph.D., Demonstrator of Physiology in the Medical Department of the University of Texas, etc. Philadelphia: W. B. Saunders, 1892.

IN this little book, Dr. Cerna has enumerated a vast number of remedies, not all of them new, we are afraid, and too many of them indifferent. Those new ones that deserve to be better known deserve a fuller introduction—and this, we think, Dr. Cerna will not deny. He has, indeed, noticed the fact that the enormous accumulation of new drugs is both a cause and a result of the excessive skepticism of some physicians and the excessive optimism of others. We mean that some men have too much faith in new medicines, and others too little, and that the swollen market of drugs, many times multiplied and compounded, is a cause. We are not opposed to new trials, for "he that will not apply new remedies must expect new evils." But we are opposed to hasty and ill-conceived efforts with drugs, new and almost unknown, with nothing to recommend them but the dirty prospectus of an itinerant vender; for in this way it may happen that good medicines are contemned and mischievous ones exploited, and the science itself in the end lowered toward its old state of quackery and absurdity. Dr. Cerna is willing to make

trial of a new drug without sufficient experience to justify him, on the ground (the remark is not Dr. Cerna's, but he approves of it) that "Chemists are so multiplying compounds, that if each compound is to be thoroughly studied by the physiologist the result would hardly be contained in the world's literature, and it is worth while . . . . to carry these investigations far enough to determine the practical importance of new agents."

Before we accept this extraordinary assertion, we desire Dr. Cerna to show us that we can safely abandon the ground taken by science, namely, that we must have some definite principle established by experience to go by, or to speak less generally, that before we think fit to use a new drug we must examine it with care and precision in the laboratory. In any case, when there are so many drugs to choose from, we must have some other and better method of judging them than Dr. Cerna's book affords, if we are not to act quite arbitrarily and take them all higgledy-piggledy. For his descriptions are too meagre to aid us in our choice. Too often they do not succeed in establishing any striking superiority, any strongly marked differences, aside from physical differences, among the new remedies, so that we can say of a drug in dispute, "Here at least it differs for better or for worse from another." In a word, we advise Dr. Cerna to enlarge his *Notes* and to give us a well-digested volume. P. B.

THE CHEMICAL BASIS OF THE ANIMAL BODY. AN APPENDIX TO FOSTER'S TEXT-BOOK OF PHYSIOLOGY. (Sixth edition.) By A. SHERIDAN LEA, M.A., D.Sc., F.R.S. Pp. 280. New York: Macmillan & Co., 1893.

THE present volume, although bearing the same title and by the same author as the Appendix on the Chemical Basis of the Animal Body in the fifth edition of Prof. Foster's *Text-book of Physiology*, is practically a new book; it is a complete and systematic work, while the former Appendix comprised but an outline of the subject.

All the good features of Dr. Lea's past work are present in this volume, and, besides, he has made the most of the additional opportunity afforded by its greater scope. Written evidently with the purpose of reflecting the latest knowledge of the chemistry of animal life, the accurate has been thoughtfully sifted from the unreliable, and each statement set forth in brief and clear terms. Particularly to be commended are the number and completeness of the references, especially those relating to recent original papers and important publications.

After a general consideration of the proteids, their composition, reactions, and classification, the chemistry of each member of the several classes is taken up separately. Discussing the constitution of proteids, the author says: "It cannot as yet be said that we possess any real knowledge of the constitution of proteids, and the question will probably remain unsolved until some entirely new departure is made in attacking the problem, or until some new property of proteids is discovered by which their absolute purity may be determined as the necessary preliminary to the whole investigation. The so-called crystallized proteids have not as yet been prepared in sufficient quantity to admit of the easy and decisive application of the modern methods of organic chemistry to

the elucidation of their molecular structure. Work in this direction, on a really large scale, could hardly fail to yield important results. Schrötter has recently described the preparation of benzoylated ethers of the albumoses, and intends to apply the method to other proteids, and to study the products of decomposition and oxidation of these substances. Whether any real advance will be made in this direction cannot be foretold, but this new departure is of considerable prospective importance."

The enzymes, or soluble unorganized ferments, are treated of at considerable length, as befits their interest and importance as a group. In the special description of the more important enzymes, we notice that the fat-splitting ferment of the pancreatic secretion is termed "pialyn," and we doubt not that this name, from its more rational derivation, will in time supersede the term "steapsin," now in more general use. Another feature worthy of passing notice is the account of the "urea-ferment;" this enzyme the author looks upon as originating, not only through micro-organismal activity, but also as a secretory product. "The most prolific source of the urea enzyme is in all cases the mucous urine passed in inflammatory conditions of the bladder. In this case the enzyme appears to be closely associated with the mucin, and is presumably a secretory product of the mucous membrane, for it is frequently obtained when there has been no operative use of surgical instruments which could account for the introduction of micro-organisms from the exterior."

The careful description of the urea and the uric acid group emphazises one notable feature of this volume, which is the deservedly large share of space and attention devoted to those substances that, by their relation to animal metabolism, are of particular physiological interest.

The volume is paged separately from the rest of the *Text-book* and has an excellent index of its own, besides an appended list of authorities quoted. F. W.

THE DISEASES OF THE NERVOUS SYSTEM: A TEXT-BOOK FOR PHYSICIANS AND STUDENTS. By LUDWIG HIRT, M.D. Translated by AUGUST HOCH, M.D., assisted by FRANK G. SMITH, A.M. (Cantab.), M.D., with an Introduction by WILLIAM OSLER, M.D., F.R.C.P. With 178 illustrations. New York: D. Appleton & Co., 1893.

HIRT'S *Treatise upon Nervous Diseases* has already been familiar to us in the original tongue for some three years, and our knowledge of it confirms the wisdom of the translators in placing so valuable a book in the hands of the English-reading public. The author tells us that he was influenced by the hope that here and there on certain points the treatment of the subject, by varying from that ordinarily adopted, might, while rendering the book more easily comprehensible to the beginner, make it none the less reliable as an adviser to those of wider experience. With this end in view he has considered the manner of dividing the subject-matter to be of no small importance, and has therefore chosen to discuss the diseases of the brain, those of the spinal cord, and those of the general nervous system separately, while diseases of the peripheral nerves, cranial as well as spinal, have been fully treated by themselves. A systematic discussion of the sympathetic system,

as well as of affections due to specific micro-organisms—for example, tetanus, lyssa—he has not attempted, partly because the space allotted would not allow it, and partly for other reasons. The author also calls attention in his preface to other peculiarities in his classification, which we shall presently consider. We find, for instance, that he first treats of diseases of the brain and its meninges, including those of the cranial nerves. This section is divided into the following parts: first, diseases of the meninges of the brain, then diseases of the cranial nerves, and, lastly, diseases of the brain proper. The second section embraces diseases of the spinal cord, and this likewise is considered in the way indicated above—namely, diseases of the membranes, of the spinal nerves, and of the substance of the spinal cord. The third and last section of the book is devoted to diseases of the general nervous system, and this section is, because of the details of its classification, especially interesting. Part I. deals with diseases of the general nervous system without any recognizable anatomical basis—"Functional Neuroses." Under this head are grouped: first, neuroses, which are wont to run their course without any essential implication of the general organism. They are chorea and the choreiform affections, tetany and paralysis agitans. Secondly, the author constitutes a group of neuroses in which the entire organism is more or less severely implicated, and under this head are neurasthenia, hysteria, epilepsy, and hystero-epilepsy. It is probable that most neurologists will fail to agree with the learned author upon the basis on which the division of these two groups rests. Not only is there a form of chorea which is undoubtedly the result of a general infection, but some authors do not hesitate to hint that this may be true of all forms. Again, this is very probably true of tetany. Regarding paralysis agitans, our ignorance forbids our predicating any view. One of the latest investigators in this field, however, believes that it also has its origin in a general affection (Dana).

Part II. of the section on general nervous diseases is constituted of those which present a known anatomical basis, and under this head four diseases are grouped. They are: first, multiple sclerosis; second, tabes dorsalis; third, dementia paralytica; and fourth, syphilis of the general nervous system.

It is interesting and novel, as Dr. Osler points out in the Introduction, to find tabes dorsalis so classified. Regarding the propriety of such a classification there can be no doubt, if viewed from a strictly scientific standpoint. We very much doubt, however, whether the old plan of grouping this disease closely with lateral sclerosis is not the wiser, in a text-book intended for students. Certainly no two affections of the nervous system present such striking contrasts in their etiology and symptomatology as lateral sclerosis and locomotor ataxia. Clinical pictures are often best impressed upon a student by vivid contrasts. Further, while other portions of the nervous system participate, certainly the essential lesion of the disease is in the cord.

The text is condensed and clear, and admirably rendered into English. Numerous original illustrations are found in every chapter; these form, as Dr. Osler says, "a pleasing relief to the hackneyed cuts which have for so long passed from book to book in English works." A few of them are diagramatic, anatomical, and morphological, but a large number are clinical. On the whole, the book forms an agreeable and refreshing addition to our stock of neurological text-books. F. X. D.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.A., M.D., LL.D.,

PROFESSOR OF CLINICAL MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; ASSISTANT VISITING PHYSICIAN TO BELLEVUE HOSPITAL.

The Treatment of Asiatic Cholera.

Dr. Frank Abbott, Jr., from his observations made at Swinburne Island in 1892, believes that a 2 per cent. solution of tannic acid stops the growth of the comma bacillus and destroys its vitality in from one to three hours. He recommends one-half gallon of this solution, made with sterilized water, by enteroclysm at a temperature of 104° F., and injected into the colon by a flexible catheter not less than two feet long, the pressure being regulated by a fountain syringe at the height of about four or five feet. In some instances, when vomiting has not begun, calomel in doses of ten grains, repeated every hour until thirty grains have been taken, may prove of great advantage as a deterser of the intestines. All patients should be thoroughly washed in an immersion hot bath and their skin cleansed with slightly acid solutions. They should be put in a warm bed, and stimulants, such as hot coffee or hot tea, with brandy, administered. At the first signs of collapse, hypodermoclysis up to the amount of a quart should be resorted to. This solution is of the strength of seven parts of sodium chloride to one thousand parts of sterilized water, with the addition of ten parts of brandy or six parts of pure alcohol, if needed, and the whole raised to a temperature of 98.4° F. Hot-air baths are useful to maintain the temperature of the body. If there are symptoms of asphyxia, inhalations of oxygen seem to have been of benefit. Cramps are relieved by the combined action of hot-air baths and massage. Opium and all its derivatives, chloral, and bromides are contra-indicated. In the reactionary stage the nutrition of the patient and the restoration of the impaired action of the kidneys are the principal aims of the physician. Seltzer-water with milk, carbonated beverages, champagne in moderate doses, maltine with cod-liver oil in weak children, or

with peptones in older persons, as a substitute for a combined meat and cereal diet, and in those cases where duodenal digestion is poor, will be found beneficial. The convalescence is long and tedious, and notwithstanding the apparently good condition of the patients they are very debilitated, and the least error or excess in diet may give rise to serious complications. It is believed that treatment carried out as above, with careful attention to detail and begun early enough in the disease, may reduce the mortality to a still lower figure.—*The Medical Record*, 1893, vol. xliii. p. 363.

An Untoward Action of Piperazine.

Dr. Rörig, in using this remedy upon patients undergoing treatment at the Wildungen Mineral Springs, has noted that it may produce an albuminuria, as determined by the picric acid test, reporting two cases. Piperazine is certainly not an entirely innocent remedy, and should be used with caution by those whose kidneys are unsound.—*Therapeutische Monatshefte*, 1893, Heft 3, S. 117.

A Case of Probable Poisoning by Benzosol.

Dr. B. von Jaksch, in the use of this remedy upon patients suffering from diabetes, reports that a man whose percentage of sugar was 5.7 to 5.8 per cent., received daily doses of from fifteen to forty-five grains for eight days. The sugar diminished during the use of the remedy, and disappeared three days before death. The symptoms were diarrhœa, marked icterus, small and rapid pulse, œdema pedum, hepatic and gastric tenderness, and coma.—*Berliner klinische Wochenschrift*, 1893, No. 9, S. 201.

Tin-poisoning.

Dr. W. A. Campbell reports six cases of gastro-intestinal disorder occurring in one family in a period of twelve days, one being fatal. The character of the alvine dejections suggested that the trouble was dysenteric. Investigation showed that the source of poisoning was the eating of tomatoes which had been preserved in cans which formerly contained peaches. These cans, having been ineffectually sealed with wax, had been re-heated and re-sealed. A chemical examination of the contents of a can revealed a comparatively large amount of tin and a small amount of lead. He concludes: 1. Stannous salts are poisonous to the human system, being similar in their action to the other mineral poisons—lead, zinc, arsenic, antimony. 2. The salts of tin are anthelmintic as well as the powdered product. 3. Toxic doses of the salts produce symptoms similar to those from ptomaïnes. 4. Canned-food products may contain stannous salts in poisonous quantities. 5. The danger from this source is increased from exposure to the air; hence, all fruits should be emptied from tin cans as soon as opened. The treatment pursued in these several cases was entirely symptomatic—astringent, demulcent, anodyne, or stimulant, as the symptoms indicated. The diet was milk.—*The Therapeutic Gazette*, 1893, No. 3, p. 152.

The Treatment of Diarrhœa.

Dr. Heinrich Stein gives a brief *résumé* of the subject, considering especially the remedies which influence the functions of the alimentary canal. In the cases of undue motor activity of the intestine, opium acts upon the inhibitory nerves in the same way that digitalis does upon those of the heart, interfering with peristalsis and thus checking the diarrhœa. In connection with this remedy other means, as electricity or hydrotherapy, may be of assistance. Of the same mode of action is strychnine, but, of course, it cannot be considered on account of its great toxicity. A remedy which has a high degree of usefulness on account of its paralyzing influence upon the motor nerves of unstriped muscles is atropine, which has been proved by experimentation to possess this property. The use of preparations of belladonna in lead-colic is one of long standing. In case of indigestion in stomach or intestine, and absorptions of toxines, antiseptics are indicated, of which creasote is the one mentioned. Exceptionally the use of either galvanism or faradism can be recommended. If the former, two large electrodes are used, one upon the back and the other upon the abdomen, through which a moderately strong current (three to ten milliampères) should be passed. In some cases faradism has yielded good results. An electrode introduced into the stomach and the current passed outward to one upon the abdomen may be employed. The influence upon the temperature, changes in the calibre of the bloodvessels, and in peristalsis can be brought about by hydrotherapy, and the effect of heat upon the peristalsis is a long-recognized fact.—*Centralblatt für die gesammte Therapie*, 1893, Heft 4, S. 193.

The Treatment of Myxœdema.

Dr. John P. Henry reports one case cured by the use of the thyroid extract, which was administered hypodermatically, bi-weekly, in doses of thirty minims. After the first injection there was an epileptic fit; after the fourteenth, a small abscess formed; after the nineteenth, which was stopped after six minims had been given, there was faintness, great flushing of the upper part of the body, and pains in the back. The duration of treatment was about nine weeks.

Mr. Benj. Dee Shapland has treated a case of ten years' duration by feeding with the thyroid gland of the sheep. The treatment lasted two months, and consisted in the taking of half an underdone thyroid gland the first thing in the morning with the ordinary food. The result of this method of treatment was satisfactory.—*British Medical Journal*, 1893, No. 1684, p. 737.

Bhutea Frondosa.—*Roxb.*

Mr. R. A. Banerjee presents a brief clinical study of this Indian drug, also variously known as Palas, Kingsook, Dhak, Brahoma-virikhsh, Tesoo, and Mandar. This is the bark of a forest tree, the middle layer of which (the mesophlœum) exudes a gummy matter, which, when dried, forms small ruby-red, brittle masses, sparingly soluble in spirits, but soluble in water, forming a deep-red solution. It has an astringent taste, but it is quite odor-

less. It is sold in the bazaars under the name of *kamarkas* or *chunia ki goud*. It is much used in native practice as an astringent and tonic, and in some parts of India as a household remedy for serous diarrhœa and the pyrosis of pregnancy. In cases of diarrhœa and dysentery, when from extreme debility opiates and ipecacuanha could not be used, and when simple kino or tannic acid was found to be less effectual, this remedy has been used in the following doses: for children, five to ten grains with cinnamon powder, twice or thrice daily; for adults, twenty to forty grains, four or five times daily. If aromatics are not administered with it, wind is created. Seven cases are reported which illustrate its use. The remedy is cheap and easily procured. —*The Indian Medical Record*, 1893, No. 6, p. 182.

Subcutaneous Injections of Phosphate of Soda.

M. Ed. Égasse, after reviewing the literature of the injection of the products of animal origin, has set out to determine whether phosphate of soda would not yield equally as good results as those obtained by Brown-Séquard and Constantin Paul. The preparation used was a 2 per cent. solution in cherry-laurel water, which was frequently renewed, thus avoiding decomposition. The amount employed was a little less than fifty minims daily, or every second day, injected into the arm or leg. Crocq, Jr., found that these injections acted purely as a tonic to the nervous system, the results being curative in those affections which depend only upon a functional disturbance of the cerebro-spinal axis, being only palliative when lesions of the nerve centres exist. These conclusions have not been, however, verified by other observers, although it is admitted there is a momentary tonic result, such as may be obtained by distilled water, chloride of sodium, and glycerin, but by no means comparable to that resulting from the use of the testicular extract. The conclusion appears to be justified that the value of the animal extracts does not consist alone in the phosphorus which they contain.—*Bull. gén. de Thérapeutique*, 1893, 12e liv., p. 265.

The Action of the Inorganic Salts of Serum, Milk, Gastric Juice, etc., upon the Isolated Working Heart.

Dr. W. H. Howell has shown that the belief that an isolated frog's heart beats because it is directly nourished by the proteids of the serum which is supplied to it, must be modified, to some extent at least. He finds that the inorganic salts of serum, when alone, and present in proper proportions to each other, are capable of keeping the heart beating for many hours, and this fact is sufficient to explain, in part at least, the so-called nutritive action of serum on the heart. After experimenting with the proteids, it was found that the beating heart consumes a very minute amount of proteid, if any at all, from the circulating liquid. This adds to the improbability of the view usually adopted, that the contractions of the heart under such circumstances are dependent upon the direct assimilation of serum albumin from the circulating liquid, and tends to confirm the conclusion that the constituents of the serum immediately concerned in starting the series of changes which precede the heart-beat are the inorganic salts, and especially the salts of calcium. Similar conclusions were reached in the case of milk, and of gastric

juice; with the salts of the saliva the action was much less favorable than with those above mentioned. It is not claimed that the experiments described prove that the inorganic salts of the blood act as a chemical stimulus to heart muscle or nerve, but they seem to support such an hypothesis, and lead us to think that the old theory of the causation of the heart-beat may not be so entirely beyond question as modern physiologists have assumed.—*Journal of Physiology*, 1893, Nos. 2 and 3, p. 198.

The Treatment of Chronic Valvular Disease of the Heart.

Dr. James Tyson notes the relief obtained from the occasional use of purgatives—five to ten grains of blue mass, followed by a saline, or the continuous use of small doses—one-half to one grain thrice daily. In regard to digitalis, the suggestion is made that the greater apparent effect of the infusion is due to its use in larger dose, although it is likely to be better borne by the stomach. Strophanthus, better borne by the stomach, has been used in doses of ten minims every two hours for forty-eight hours without interruption. Caffeine in three-grain doses every three hours, in mitral regurgitation, is admirable, but is likely to produce insomnia. Sparteine in one-quarter, increased to one-half grain dose, three to five times daily, is valuable if a diuretic effect is desired. For irregularity of heart action and palpitation, which are more common in mitral disease, belladonna is a very useful remedy. A belladonna plaster placed over a palpitating heart is one of the most efficient agents in subduing it; nitro-glycerin, one-one-hundredth of a grain, increased to double the quantity, three times daily, is often very useful to the same end.—*Therapeutic Gazette*, 1893, No. 4, p. 217.

The Contra-indication of Morphine in the Asphyctic Form of Angina Pectoris.

Dr. Henri Huchard does not recognize in morphine the *ultima ratio* of the treatment of this condition; pain is not the dominating fact. The cause of death in the accidents of asphyxia and acute asystole is in the sudden failure of the cardiac muscle, and there are two indications to fulfil: 1. To facilitate the work of the myocardium, remove peripheral resistance by the use of trinitrin, nitrite of amyl, and stimulating frictions which dilate the bloodvessels. 2. Act directly upon the heart muscle, best by repeated injections of ether and of caffeine; in addition, injections of a 10 per cent. solution of camphor in sterilized olive oil may be useful.—*Revue gén. de Clinique et de Thérapeutique*, 1893, No. 15, p. 227.

The Treatment of Acute Croupous Pneumonia in Children.

Dr. J. F. Goodhart believes that the simplest methods are, for the most part, the most successful: a little acetate of ammonium to induce diaphoresis; paregoric or Dover's powder to ease pain and not to interfere with the action of the skin; aconite, if the disease be acute; carbonate of ammonium as a stimulant; an occasional dose of an antipyretic might be useful. Poultices had been abandoned in favor of either hot or cold packs,

and a light cotton-wool jacket. The ice-bag to the chest was a very valuable method of treatment, and one that might safely be adopted in all but the youngest children without any undue precautions.

Dr. Henry Ashby uses the methods given above, as well as digitalis or alcohol, and has found oxygen inhalation very useful as a temporary restorative. The cold, or rather the graduated bath in hospital practice had been followed by considerable success, but it undoubtedly requires care, as an alarming depression might easily be produced.

Dr. C. N. Gwynne did not consider that the ice treatment could ever be adopted as a routine treatment. If there was high temperature and great restlessness, antifebrin was a valuable adjunct to other treatment. Alcohol was unnecessary in most cases, and often harmful.

Dr. Moss Madden relies upon quinine or antipyrine in combination with small doses of gray powder, a milk diet, and, when stimulants are wanted, either brandy or whiskey in quantities proportioned to the age and condition of the child.

Dr. Samuel West has found that antipyretic drugs are of doubtful value; baths and packs have their uses, but also abuses. Dyspnœa and cyanosis have but one means of relief—free venesection. Among the cardiac tonics he would give a high place to caffeine, either by the mouth or subcutaneously. —*British Medical Journal*, 1893, No. 1685, p. 782.

The Treatment of Asthma.

M. J. P. Nuel recognizes in the filaments described by Curschmann, in 1882, an important factor in the causation of bronchial asthma. Believing that these filaments, in the case of the eye, have their origin in a retarded elimination of corneal epithelium with a tendency to the formation of mucus, and noting that a two per cent. solution of chloride of ammonium favored this elimination and liquefied the mucus, he believes that the same remedy would benefit the bronchial asthmas, and this belief has been confirmed by the marked success attained by Dr. Delbovier.—*Bulletin de l'Académie Royal de Médecine de Belgique*, 1893, No. 2, p. 165.

Alumnol in Diseases of the Throat, Nose, and Larynx.

Dr. Albert Spengler has used this recent addition to the materia medica in one-half, one, two, five, and ten per cent. aqueous solution applied by means of cotton to the diseased mucous membrane. These solutions are clear, of a brownish-yellow color, of a slightly astringent taste, and even in the ten per cent. solution are not caustic. Eight cases of acute and chronic pharyngitis, ten of acute and chronic laryngitis, and two of empyema of the antrum of Highmore, were under observation. Three cases of slight acute laryngitis were cured in from four to eight days by a twenty per cent. solution. In the various forms of pharyngitis, particularly of pharyngitis sicca, this remedy rendered good service, but without excelling that rendered by a one or two per cent. solution of chloride of zinc, although the former was much more pleasant for the patient. In diseases of the larynx the chloride of zinc gave better results. The two cases of empyema of the antrum of Highmore

were not benefited by syringing the cavity. In these cases the use of oxychinaseptol, otherwise known as diaphtherin, was followed by success. In three cases of empyema of the antrum of Highmore, and in five cases of ozæna, this remedy, employed in from one-half to one per cent. solution, was well borne by the patient, and demonstrated its extraordinary antiseptic power.—*Münchener med. Wochenschrift*, 1893, No. 13, S. 243.

Aspidospermine.

Dr. G. Bordet states that the aspidospermine of commerce is a mixture of several products derived from the quebracho aspidosperma, but it possesses practically the properties, excepting the antithermic, which is stronger than the contained quebrachine, of the pure alkaloid. It increases the depth and amplitude of the respiratory movements, slows the heart, and lowers the temperature. Huchard has recommended this drug in dyspnœa of functional origin. The dose is from one to two grains, which is soluble in water, with the addition of a few drops of a ten per cent. solution of sulphuric acid, which, however, should be neutralized by bicarbonate of soda, if it is intended for hypodermatic use.—*Les Nouveaux Remèdes*, 1893, No. 6, p. 135.

The Significance of the Diphtheritic Membrane in its Relation to Treatment.

Dr. M. J. Oertel divides cases of diphtheria into two classes: 1. When the local manifestations are at the outset superficial; and 2. When they commence in the tissues themselves. Cases of the first class are due to direct infection, and require careful antiseptic treatment, which consists in the destruction of the bacteria and prevention of their increase, and the absorption of the virus which they produce. The further production of the membrane will be prevented by the removal of the cause of the disease.

The problem is to keep a sufficient amount of the antiseptic material for a sufficiently long time in contact with the diseased mucous membrane for its effectual operation. The use of remedies by gargling is unsatisfactory on account of the short time during which the remedy is in contact with the membrane. Painting the diseased mucous membrane with stronger antiseptic remedies produces much shorter time of contact; the remedy is diluted by saliva and mucus; it is not thorough in application, and requires frequent repetition. The application of remedies by the use solely of the steam atomizer is recommended; this permits of three to five minutes' contact, and can be repeated every two or three hours. Carbolic acid, in from 2 to 5 per cent. solution, used as above, has never given rise to poisoning, and yet seems to be the most suitable remedy.

In cases of the second class, where the membrane is a secondary manifestation of a primary general infection, the problem is entirely different. The place where the local antiseptic treatment should reach is one deep in the mucous membrane. The diphtherotoxine is already taken up by the lymph-cells of the blood and lymph and is widely distributed. Here local treatment, which tends only to the annoyance of the patient, and cannot exert a favorable influence upon the disease, is superfluous. However, the use of so-called

solvent gargles (alkalies, lime, soda) is of use in preventing stenosis of the air-passages, and, by disinfecting the mouth, in preventing the development of a septic form—a croupous form of diphtheria. Useless as remedies, and disturbing to the patient, are nitrate of silver, chromic acid, chloride of iron, and the galvano-cautery. Of constitutional treatment, that by blood-serum is based upon purely experimental researches and is uncertain, and chlorate of potash has been abandoned. The preparations of mercury, inunction or internal use of calomel, sublimate, or cyanide, have been followed by favorable results, although the knowledge of the action of these remedies upon zymotic processes is not sufficient to justify the statement that they possess a specific action against the diphtheritic process. From an empirical standpoint, the use of the cyanide is vindicated; so also is that of quinine. Its antipyretic and parasiticidal action is, however, open to question.—*Berliner klinische Wochenschrift*, 1893, No. 13, S. 297; No. 14, S. 331.

Jambul in Glycosuria.

Dr. Vix contributes a brief report of the use of this remedy in two instances. In the first, about ten drachms of the extract, made from the fruit, was used each day for five days; the amount of sugar, being at first 7 per cent., entirely disappeared, and did not reappear for two years, a rigid diabetic diet being, however, insisted upon. In the second, a somewhat larger dose of the extract, made from the bark, was administered, and the sugar, formerly 3 per cent., entirely disappeared on the tenth day; in this case, also, the diet was prescribed. In the use of the extract made from the bark marked diuresis supervened in one instance, the specific gravity of the urine falling from 1031 to 1002. No unpleasant symptoms have been observed in the use of this remedy.—*Therapeutische Monatshefte*, 1893, Heft 4, S. 160.

[This report is in marked contrast to the failures which have been recorded by competent observers. Either the cases of diabetes have not been properly classified or the remedy is not of constant strength. It is by no means a new drug, for it is mentioned in the *Charaka-Samhita* more than a thousand years ago.—R. W. W.]

Concerning Mercurial Treatment.

Dr. Charles Mauriac believes that this remedy, in common with others which at the same time are poisonous and are of therapeutic value, must be so used that the different degrees of curative action shall be exhibited according to the circumstances of each case, and yet toxic effects, which may be even antagonistic to its therapeutic action, may be avoided. The curative principle of the remedy does not change, it matters not by what means it is introduced into the system, nor indeed in what form; the question of dose is important, and the differences in results arise only from the rapidity with which the system can be mercurialized. The rapidity of the curative action does not imply that it shall be of long duration, or that it may have some preventive power, if it is slow and gradual. On the contrary, when a syphilitic is attacked by erysipelas, or by pneumonia, or by typhoid fever, the rapidity of the disappearance of the symptoms is frequently marvellous. In

commencing treatment it is proper to place the patient upon a diet which shall aid the absorption of the remedy, and to limit to some extent the nutritive functions. From time to time purgation is proper; to supervise the diet limiting it in quantity, choosing it according to the temperament of each individual. In a considerable number of patients, especially in women, the question of tonics, reconstituents, and substantial diet will arise. The mouth and teeth should be attended to before treatment is commenced, and the digestive functions carefully examined. Above all things the renal functions should be carefully attended to, for it is by these organs that the remedy is eliminated. In all cases the treatment must be adapted to the individual, and the particular condition of that individual at different times.—*Revue gén. de Clinique et de Thérapeutique*, 1893, No. 15, p. 225.

Gallanol.

Dr. Blanc has furnished a careful review of the recent literature. Gallanol is a white crystalline body, of a slightly bitter taste, slightly soluble in cold, freely in hot water and in alcohol, also in ether, benzine, and in chloroform. The alkalies dissolve it, yielding a brown coloration, but without sensibly decomposing it. It is prepared by boiling tannin with anilin, treated with water acidulated with hydrochloric acid, from which it crystallizes and is purified by successive recrystallizations. It does not possess irritant properties. Cazeneuve and Rollet have used this remedy in psoriasis as an ointment, in strength from 3 to 25 per cent. They have not found that it gave rise to redness of the skin, nor to inflammation, nor to pigmentation. No other treatment has been so successful; the absence of poisonous properties, the fact that it ought to favor cicatrization of wounds, and its astringent effects, render this drug an important one. It apparently has value for the treatment of the eczemas, catarrhal lesions of the mucous membranes, especially in the blennorrhagias of the gouty.—*Revue de Thérapeutique Médico-chirurgicale*, 1893, No. 8, p. 214.

The Treatment of Lepra Tuberosa by Europhen.

Dr. Julius Goldschmidt reports five cases treated by injections of this remedy, in 5 per cent. solutions in oil, with favorable results. The duration of the treatment was of several months, the masses becoming reduced to one-third to one-half of their original size. Increase in growth, however, followed the cessation of treatment. In making a study of pyoktanin it was found that this remedy was of no avail.—*Therapeutische Monatshefte*, 1893, Heft. 4, S. 153.

The Action of Phenocoll Hydrochloride in Malaria.

Dr. Giovanni Cucco, in reviewing the literature, cites the reports of Albertoni, Prati, Novi, Venturini, and Crescimanno. As the remedy is completely eliminated in twelve hours, it is important to administer it so that it shall be completely absorbed before the febrile attacks. The dose is seven grains, repeated until fifteen to twenty-two grains are taken in a day. In eighty-four cases, success followed in fifty-two; the result was doubtful in

twenty-one, and in four cases it was without effect. The remaining seven cases are of too recent observation to be conclusive. It is apparently a remedy devoid of danger, and, even in the severe cases coming under the author's observation, a successful one.—*Therapeutische Monatshefte*, 1893, Heft 4, S. 156.

The following articles are worthy of notice:

"The Physiological Action of Massage upon Metabolism." DR. ANTON BUM, in the *Wiener medizinische Presse*, 1893, No. 1, S. 3. It has a diuretic effect, but the relationship to the excretion of the urinary solids is by no means proportional.

"Clinical and Experimental Contributions to the Treatment of Pulmonary Tuberculosis by Creasote." DR. ALBERT ALBU, in the *Berliner klinische Wochenschrift*, 1892, No. 51, S. 300. Creasote, even in large doses, exercises no influence on tubercle bacilli and the specific tubercular process in the lungs.

"The Nutritive Value of Asparagin." PROF. A. BALL[illegible], in *La Riforma Medica*, 1893, No. 52, p. 616. The loss of weight of animals fed upon a diet devoid of albumin, but with the addition of asparagin, is not so great as of animals dead from inanition. But this fact does not permit the conclusion that asparagin is a perfect nitrogenous food, or that it will completely take the place of albuminoids.

"Alcohol and Digitalis." DR. ERICH HARNACK, in the *Münchener medicinische Wochenschrift*, 1893, No. 9, S. 169. Digitalis should be used to improve the vascular tonus, and in the use of alcohol "individualisiren, nicht schematisiren."

MEDICINE.

UNDER THE CHARGE OF

W. PASTEUR, M.D. LOND., F.R.C.P.,

ASSISTANT PHYSICIAN TO THE MIDDLESEX HOSPITAL; PHYSICIAN TO THE NORTHEASTERN HOSPITAL FOR CHILDREN;

AND

SOLOMON SOLIS-COHEN, A.M., M.D.,

PROFESSOR OF CLINICAL MEDICINE AND APPLIED THERAPEUTICS IN THE PHILADELPHIA POLYCLINIC; PHYSICIAN TO THE PHILADELPHIA HOSPITAL.

EMPYEMA CONSEQUENT UPON ENTERIC FEVER.

WEINTRAUD (*Berliner klin. Wochenschr.*, XXX. Jahrg., No. 15, p. 346) has reported the case of a man, nineteen years old, who had had a left-sided exudative pleurisy three years previously, in which, at the close of the second week of an attack of enteric fever, slight impairment of the pulmonary percussion resonance was noted posteriorly, which was ascribed to hypostatic

congestion. Defervescence took place in the fourth week, but emaciation persisted. The temperature rose again subsequently, and the dulness on percussion at the base of the left chest posteriorly, failed to clear up, so that the existence of a pleuritic effusion was suspected. Vocal resonance was slightly enfeebled upon the lateral aspect of the left chest. Exploratory puncture disclosed the presence of pus in the left pleural cavity, in which, upon bacteriological examination, it was demonstrated that bacilli corresponding to those of enteric fever were present. In the reduced condition of the patient it was deemed best to defer operative interference. Two days after the exploratory puncture, symptoms of peritonitis (collapse, vomiting, small frequent pulse, subnormal temperature) suddenly appeared, suggesting the occurrence of rupture into the peritoneal cavity. Energetic treatment with opium was instituted, and at the end of a week the condition of the patient was much improved. The temperature was now observed to be elevated in the evening, and puncture made in the same situation as before demonstrated the presence of pus, which contained bacilli like those found in the fluid first removed, but much less virulent. Some degree of immunity to inoculation with virulent organisms was conferred upon animals treated with pus from the second puncture. The patient now entered upon convalescence, which proceeded to speedy recovery.

Pulmonary Abscess; Incision; Recovery.

Fairchild (*Chicago Clinical Review*, vol. ii., No. 23, p. 118) has reported the case of a miller, fifty-five years old, in which, after convalescence from an attack of pneumonia had apparently been established, febrile symptoms returned, with chills and cough and the expectoration of a small amount of extremely offensive matter, suggesting the existence of gangrene of the lung. Despite faithful stimulating and supporting treatment, the condition of the man grew steadily worse. The heart was found slightly displaced to the right. The pulmonary percussion resonance was found to be somewhat impaired anteriorly (it is not indicated upon which side, however) and the respiratory murmur enfeebled, while posteriorly the percussion-note was absolutely dull, and the breath-sounds could not be heard at all. Change of posture occasioned no change in the physical signs. It was concluded that a pulmonary abscess existed, and operation was determined upon. After several unsuccessful punctures the aspirating needle was introduced into the fifth intercostal space just anteriorly to the angle of the ribs, and a free flow of pus followed. With the needle as a guide, ample incision was made, and, as the ribs were too close to permit of a satisfactory entrance into the chest, the lower portion of the fifth rib was resected for a distance of about two inches. The visceral and parietal layers of the pleura were found adherent; so that after a passageway had been made by means of the fingers a dressing-forceps was introduced, the blades widely separated, and about ten ounces of pus permitted to escape. A large perforated rubber drainage-tube was introduced to the bottom of the abscess and secured to the external wound by a suture. The cavity was thoroughly irrigated with a solution of boric acid, until the fluid returned clear. Iodoform gauze was loosely packed around the tube and a generous dressing of borated gauze

applied. The patient reacted well from the anæsthetic and the operation. The dressings were for a time changed daily, the discharge of pus gradually lessening. Cough and expectoration soon ceased. At the end of a year the patient was perfectly well.

The Influence of Carbohydrates upon the Elimination of Nitrogen in Diabetes.

Leo (*Zeitschrift für klin. Medicin*, Bd. xxii., Heft 3, p. 225) reports the results of a study of the relation in diabetes between the ingestion of carbohydrates and the elimination of nitrogen. It has been shown that, in the grave cases of diabetes at least, there is increased elimination of nitrogen, dependent upon excessive disintegration of the albumin of the body. It is as a result of this process that the marked wasting takes place. The therapeutic indication is, thus, not alone to overcome the elimination of sugar but also to limit or diminish the destruction of albumin. The most important measure applicable to otherwise healthy and to some sick persons, when such excessive destruction is going on, consists in the administration of non-nitrogenous food, *i. e.*, fats and carbohydrates. This conservative action of the fats has already been demonstrated. The object of this study is to establish the relation of the carbohydrates to the destruction of albumin in the body.

It is evident that only that portion of the carbohydrates which is assimilated, *i. e.*, not excreted unchanged as sugar, can diminish the destruction of albumin. It has been shown that while starch, dextrin and dextrose increase the excretion of sugar in diabetes, the other carbohydrates, and especially the celluloses, do not, but are entirely consumed. Even the starches and dextroses are, however, not excreted entirely unused and unchanged, but are in part stored up in the system. The question remains whether or not this gain is neutralized by other processes. In this connection the influence of increased elimination of sugar upon the diuresis, and the influence of this upon the elimination of nitrogen, must be considered.

For comparative purposes it was necessary to make a study of the patient under conditions as nearly normal as possible. For a day he was, therefore, placed upon a well-adjusted ordinary diet, and for the subsequent twelve or twenty-four hours the urine as it was passed was examined as to the amounts of sugar and nitrogen that it contained. On the morning of the next day the patient was given a trial meal (consisting of 75 grammes of cane-sugar, 120 grammes of "maizena," and 50 grammes of butter, boiled with 250 grammes of water to a jelly-like mass) and nothing further until the experiment was concluded. The urine thereafter passed from hour to hour was examined as to amount and proportion of sugar and nitrogen. Analysis showed that the trial meal contained only an infinitesimal amount of nitrogen. The meal thus consisted essentially of carbohydrates, fat, and water, the carbohydrates preponderating. The butter was added for the sake of palatability.

Observations upon three healthy persons showed that the ingestion of the trial meal was followed by a variable but distinct increase in the amount of nitrogen excreted in the urine, together with the elimination of an increased amount of urine. In a case of diabetes insipidus it was found that while the

amount of urine excreted hourly was not inconsiderably increased, the hourly elimination of nitrogen was not increased correspondingly. It thus appears that in these observations the conservative action of the carbohydrates as concerns the disintegration of albumin is not appreciable—*i. e.*, it is neutralized by the increased elimination of nitrogen as a result of the increased secretion of urine.

Observations made on ten cases of diabetes mellitus showed that the ingestion of the trial meal was also soon followed by a considerable increase in the amount of nitrogen contained in the urine, in conjunction with the elimination of an increased amount of urine and increased amount of sugar. This increase was shortly followed by a diminution. Investigation showed further, that in general the increased elimination of nitrogen was more considerable in diabetics than in normal individuals, palpably as a result of the greater increase in the amount of urine secreted following upon increased diminution of sugar. It was noted that while in healthy individuals the amount of nitrogen eliminated hourly was smaller after the primary increase than during the preparatory treatment, this was the case in but three diabetics, while in six the diminution was much more tardy than in the normal. This difference may be ascribed to the protraction of the increase in the amount of urine secreted as a result of increased elimination of sugar. This relation can only be considered as of unfavorable significance. It was most evident in the graver cases.

These results demonstrate the dependence of the elimination of nitrogen upon the diuretic influence of the carbohydrates, but cannot be utilized directly to determine whether or not the administration of carbohydrates is attended with a conservation of the albumin of the body. For this purpose the observations would have to cover a longer period of time.

It has, however, been shown that the administration to a diabetic of increased amounts of carbohydrates, without change in bodily weight, is followed by a diminished elimination of nitrogen in the urine. While these observations indicate that in diabetes as much of the ingested carbohydrates as is absorbed prevents disintegration of the bodily albumin, actual demonstration is wanting, for it is not known how much nitrogen is eliminated in the stools.

To make good this deficiency two additional cases of diabetes mellitus were subjected to further study. For a number of days the patients were given a diet containing a known amount of nitrogen, and the quantity of urine, the amounts of sugar and nitrogen eliminated in twenty-four hours, as well as the amount of nitrogen in the stools, determined. After the ingestion and elimination of nitrogen became equal, the actual experiment was begun. Then, known quantities of "maizena" and sugar, made with water into a gelatinous mass, were additionally given; and the elimination of nitrogen was compared with that of the previous days. It was found that while the amount of urine secreted was increased, the amount of nitrogen excreted in urine and stools was not correspondingly increased. The results of these observations showed that the administration of carbohydrates to diabetics was attended with a lessening of albumin-metabolism.

The importance of these investigations in their bearing upon the treatment of diabetes must be evident. While it may not be possible in every case to

have the amount of nitrogen eliminated determined, important indications may be gained from a knowledge of the body weight and the amount of urine excreted, in addition to a knowledge of the amount of sugar excreted.

A Case of Congenital Cirrhosis of the Liver.

Neumann (*Berliner klin. Wochenschr.*, Jahrg. xxx., No. 19, p. 445) has reported the case of a child that was noticed to be jaundiced on the day after birth. It was restless, cried a good deal, and took little nourishment. The stools were thin, frequent, and grayish-white in color. For a short time there was a slight increase in weight, but this was subsequently followed by a loss. The urine was free from albumin and sugar, but contained biliary coloring matter. On physical examination the liver was found to be considerably and the spleen slightly but distinctly enlarged. The family history pointed to the existence of syphilis, and a diagnosis of congenital occlusion of the biliary passages was arrived at. The child died, when almost four months old, of an attack of pneumonia. Upon post-mortem examination, in addition to icterus, enlargement of the liver and spleen, and pleuro-pneumonia, the gall-bladder was found to be small and containing no bile. The cystic and common choledoch ducts were patulous. On section, the structure of the liver was firm and slightly granular; no bile and no ducts could be seen. The acini were dark-green and separated by small grayish-white bands of connective tissue; in some places the outlines of the acini were destroyed. Microscopically, the acini were found to be diminished in size. Flakes of pigment lay between the hepatic cells. There was no diffuse infiltration within the acini. The interacinous connective tissue was greatly increased, and was constituted of embryonal tissue in which connective-tissue cells could still be seen. Within the connective tissue there was evident hyperplasia of the biliary capillaries. There were also pigment granules in the connective tissue. These changes were present in those parts of the liver in which to the naked eye the outlines of the acini were indistinct. In the slightly increased interacinous connective tissue considerable cellular infiltration was present.

Tuberculosis of the Skin in Conjunction with Tuberculosis of the Larynx.

Köbner (*Berliner klin. Wochenschr.*, Jahrg. xxx., No. 19, p. 444) has reported the case of a man, forty-three years old, who presented, an inch below the margin of the lower jaw to the right of the median line, an ulcer, of circular outline, about as large as a silver dollar, the base of which was grayish and covered in part by crusts and in part by granulations. The margins of the ulcer were flat, slightly livid, but little infiltrated, not undermined, but uneven, and marked by numerous nodules, ranging in size from a millet-seed to the head of a pin. The adjacent lymph glands were enlarged. On laryngoscopic examination, intense perichondritis of the epiglottis and arytenoids was found, with extensive ulceration of the vocal bands. Examination of sections of a portion of tissue removed from the neck disclosed the presence of tubercle bacilli and the histologic appearances of a tuberculous process.

There was no family history of tuberculosis, but ten years previously the man had lost his wife (after having been married for ten years) from tuberculosis. Three years later he was seized with hoarseness and sore-throat and was treated for tuberculosis of the larynx and lungs. He was then fairly well for four years, when he noticed a small area of ulceration below the jaw. The ulcer progressively increased in size and the man again became hoarse. There was no history of syphilis, but the man was for a considerable period of time treated actively with potassium iodide and mercury. Instead of improving, his condition continued to grow worse, until he became markedly anæmic, highly emaciated, and entirely aphonic. Locally, iodoform was dusted upon the ulcerated area, but the prognosis was considered highly unfavorable.

Bronchiectasis Successfully Treated by Pneumotomy.

Hofmokl (*Wiener medicin. Presse*, Jahrg. xxxiv., No. 18, p. 681) has reported the case of a man, forty-three years old, who for five weeks had complained of slight pain in the right side of the chest, with cough that was most marked at night. There was moderate expectoration, the ejected matters as well as the breath after a short time having a most offensive odor. There was also slight febrile movement. The appetite was impaired, sleep was disturbed, emaciation was apparent. The chest was short, but broad and well arched. Respiration was short, quiet, rhythmical, and principally abdominal. The chest was a little flatter anteriorly and posteriorly on the right than on the left. The respiratory movement appeared to be symmetrical. Vocal fremitus was a little less distinct on the right anteriorly than on the left. The percussion resonance was sonorous on the right side above the clavicle; over the clavicle there was absolute dulness; in the first, second, and third intercostal spaces the resonance was almost entirely wanting, becoming manifest again externally at the mammillary line. Elsewhere the percussion sounds were normal. On auscultation the respiratory murmur was found to be vesicular in the right supra-clavicular fossa; of bronchial character in the first and second interspaces near the sternum; elsewhere in the area of impaired resonance indefinite and vesicular. Whispering pectoriloquy could be elicited between the first and second ribs. Isolated dry râles were audible in the area of dulness. The amount of expectoration increased, but no tubercle bacilli could be found in the sputum. A solution of methyl-violet injected into the second interspace at once appeared in the sputum. Bronchiectasis was diagnosticated, and, ordinary medicinal measures failing to bring relief, pneumotomy was determined upon. The patient being chloroformed, an incision about three and one-half inches long was made in the second intercostal space. With the point of the actual cautery at red heat, the lung was entered through the thickened and adherent layers of the pleura. Less than a drachm of putrid, offensive pus escaped. There was no escape of air. A sound passed a distance of a little more than an inch into the depth of the lung. The hemorrhage was insignificant. The wound was drained, packed with gauze, and covered with a protective dressing. The expectoration at once diminished decidedly, and the sputum in a short time

lost its offensive odor. In the course of the treatment, air was on coughing expelled through the opening. There was progressive improvement in both the local and the general condition, until recovery ensued.

SURGERY.

UNDER THE CHARGE OF

J. WILLIAM WHITE, M.D.,

PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA; SURGEON TO THE UNIVERSITY AND GERMAN HOSPITALS;

ASSISTED BY

ALFRED C. WOOD, M.D., INSTRUCTOR IN CLINICAL SURGERY, UNIVERSITY OF PENNSYLVANIA; ASSISTANT SURGEON, UNIVERSITY HOSPITAL.

AND

C. L. LEONARD, M.D., ASSISTANT INSTRUCTOR IN CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA.

TOTAL EXTIRPATION OF POPLITEAL ANEURISMS.

MEINHARD SCHMIDT advocates, in the *Archiv für klinische Chirurgie*, 1893, Bd. xxiv., Heft 4, the extirpation of popliteal aneurisms. The aneurism is to be removed exactly as if it were a tumor. The advantages over the Antyllean method, which is the next most radical, is that no unnecessary part of the diseased vessel is left behind, which might become the seat of suppurative processes.

In the forearms and legs, where there are two main vessels of supply, and the chance for a good collateral circulation is very favorable, the radical method is the operation of choice.

The author details a case in which he excised a popliteal aneurism from each leg of a patient. The most tedious part of the operation, in nearly every case, is the separation of the vein from the artery. The integrity of the vein should be maintained if it is possible.

The author prefers packing and secondary sutures, to be tied in forty-eight hours.

In the twelve cases collected by the author (including his own), the results have been very favorable. Gangrene did not occur; even an accidental cut of the vein had no unfavorable influence upon the establishment of collateral circulation.

ON THE TREATMENT OF SPINAL ABSCESS.

WATSON CHEYNE, in an address before the British Medical Association (*British Medical Journal*, 1892, No. 1670), briefly reviews the older methods of operating, and speaks in considerable detail of the modern antiseptic methods. It is well known that the opening of these abscesses in the pre-antiseptic period was almost surely followed by profuse suppuration, rapid wasting of the patient, and frequently death. As a consequence, at that time surgeons unanimously advised against operation.

Lannelongue asserts, basing his conclusion on post-mortem evidences, that even in those cases of vertebral disease without visible abscess, a focus of caseation is usually present.

Twenty or thirty years ago, therefore, the best method of operating in cases of spinal abscess was aspiration by means of a trocar. The author, in 1888, collected fifty-eight cases which had been thus operated upon either by Sir Joseph Lister or himself. Of these, forty-nine remained aseptic throughout. Thirty-eight, or 77½ per cent., were cured at the time that the statistics were compiled. These were advancing toward cure, and five had died of tuberculosis or other causes than the abscess.

The treatment by drainage has, however, certain disadvantages. The wound requires a long period for healing; the average length of time in the cases quoted was between eight and nine months, the shortest period being two months, and the longest from two to three years.

The true pathology of these chronic abscesses is now conceded to be a tuberculous tumor with a softened centre, so that by simply opening and draining, the essential part of the disease remains untouched. The author has previously pointed out, in his lectures at the Royal College of Surgeons, three ways in which these abscess walls may be dealt with.

Excision. The most radical and satisfactory method is to dissect out the swelling without opening it, as if it were a cyst. This is applicable to many cases. For example, to many glandular abscesses, to the subcutaneous tuberculous nodules of children (gommes scrofuleuses), to many abscesses. Where this is done a clean-cut wound is left, which heals by first intention.

Piecemeal removal of the wall. If the abscess is too large, or its connections such that it cannot be dissected out in this way, the next best thing is to lay it freely open, so as to see its interior, and then remove the wall by clipping, cutting, etc. This is possible in a good many cases of abscesses in the extremities, and also elsewhere, and in this way we can generally get a healthy wound which heals by first intention.

Scraping. Either of these methods failing, we can still get rid of the greater part of the wall by making a smaller incision into the abscess, scraping away the wall with a Volkmann's spoon, or rubbing off the degenerating tissue by means of rough sponges, etc.

The way in which it has been carried out in most instances is, shortly, as follows: The necessary antiseptic precautions are, of course, taken, and a small incision is made into the abscess, somewhat larger than can admit the finger, which is then introduced and the cavity thoroughly explored. The surface of the abscess cavity is then gently scraped with a Volkmann's spoon, preferably a flushing-spoon, on the principle introduced by Mr. Barker, free exit being permitted to the fluid, and the finger being inserted from time to time to guide the spoon. Where the use of the spoon is dangerous—as toward the peritoneum or along a large vein, a good deal of the degenerating material can be removed by rubbing the surface with a piece of coarse sponge. If any loose pieces of bone is felt it should be removed, and the carious surface of the bone scraped if it can be got at. At the same time the cavity is thoroughly flushed out with warm (1 : 10,000) sublimate solution, and when it is thoroughly clean the fluid is squeezed out; one to two ounces of a 10 per cent. emulsion of iodoform in glycerin, containing a small proportion of

bichloride of mercury, is introduced, and the external wound, and also the wound in the muscles, if present, is stitched up.

Of twenty-four cases treated in this manner, thirteen healed by first intention. They were sent out in a suitable apparatus, and with apparently no recurrence. Eleven of these remained well, but two came back some months later with sinuses. Of the remaining eleven cases the greater part of the wound healed by first intention in seven instances, small sinuses only remaining at some part. These were healed without difficulty by mild measures. Nineteen of the cases were thus cured, either at once or after a second operation. The best method of treating chronic abscess, namely, the complete removal of the disease by dissection, is applicable only in very rare instances. Practically, only in those in which the disease affects the posterior or lateral parts of the vertebræ.

The Accidents which may follow Removal of Portions of the Omentum in Operations for Hernia.

Bull, under this heading, describes (*Annals of Surgery*, 1893, No. 3) some of the accidents which follow operations in which ligature of the omentum and excision are necessary.

The author has met with but a single case of hemorrhage from the omental stump, but he records a number of instances in which the stump became the seat of inflammation some time after the operation. Some of these cases underwent spontaneous resolution, while others went on to abscess formation, and thus demanded a second operation. The symptoms of the inflammatory process in the stump did not appear until from three to four weeks after the operation in the majority of the cases reported. The usual symptoms were a tender, immovable, and hard tumor, associated with local pain, rise of temperature, and vomiting. The author has invariably used silk ligatures in the past, but expresses his intention to return to the catgut ligature. He is inclined to look for the cause either in the ligatures used or some fault in the asepsis. A case is referred to in which death from perforative ulceration followed the inclusion of a small portion of the bowel wall in the omental ligature.

The article concludes as follows: In dealing with the omentum the following dangers are to be borne in mind: 1. Bleeding from inefficient ligature. 2. Damage to neighboring intestine from faulty application of the ligature. 3. Inflammation and abscess of the omental stump. These dangers should make the management of the omentum the subject of special care. Any threatened inflammation should be met by prompt excision as soon as symptoms are urgent.

Gradual Auto-Inoculation as a Factor in the Production of Immunity from Septic Infection.

Binnie calls attention (*Annals of Surgery*, 1893, No. 3) to the difference, in their clinical course, between those cases of appendicitis in which there has been perforation or gangrene of the process, and which run a rapidly fatal course, and the cases in which, after the existence of pyosalpinx for a long time, the tube suddenly ruptures and the fetid contents are poured out

into the general peritoneal cavity. The latter almost invariably recover after simple excision and drainage.

This difference the author believes to be due to an acquired immunity in the latter affection, due to the presence of the pus in the body for a long time. The researches of Reichel seem to sustain this view. This author was able to produce immunity in animals against pyogenic micro-organisms by administering gradually increasing doses of pure cultures. Reichel reaches the following conclusion: "These experiments, in my opinion, undoubtedly prove that the immunity against the virus of pyogenic micrococci attained by the methods described is an immunity of the whole organism. In other words, that this immunity not only enables the nerve centres and the heart to withstand the noxious poison of infection, not only diminishes or destroys the susceptibility of the peritoneum to its irritation, but that it increases the power of every tissue, even of the subcutaneous fatty tissues, to resist the phlogogenic properties of the cocci.

The Treatment of Fractures of the Nose.

Walker Downie (*Glasgow Medical Journal*, 1893, No. 3) contributes an interesting article on fractures of the nose.

Although these injuries follow a variety of causes, the violence is always of a direct character. The nasal bones, from their prominent position, suffer most frequently from injuries of this region. The cartilaginous septum, in the author's experience, is seldom fractured, but is frequently dislocated. More rarely the lachrymal bone, the nasal process of the superior maxilla, the vomer, and the central plate of the ethmoid, may be involved. In all cases of fracture there is more or less laceration of the overlying mucous membrane, accompanied with more or less hemorrhage.

The amount of deformity will depend on the amount of swelling and ecchymosis which follows the injury. The septum may be considerably dislocated laterally without appreciably altering the contour of the nose.

When this structure is fractured, however, or dislocated backward, a characteristic depression will be seen immediately beyond the extremities of the nasal bones. The nasal bones themselves, when broken, may be displaced backward or to either side. If the lachrymal bones are implicated, emphysema of the eyelids and cellular tissue of the orbit is apt to follow.

The treatment of these cases should consist in arresting the hemorrhage, restoring the parts to their normal condition, and the application of proper means of retention. The bleeding is best controlled by plugging the nares, and as the posterior nares are never involved they need not be packed. After a single fracture the displacement does not tend to recur after the parts have been restored, but in the cases in which there has been comminution some means of retention after reduction is necessary. The method so often recommended, of plugging the nose after introducing a catheter, followed by the application of pads of lint applied to the nose externally and retained by adhesive plaster, is condemned, on account of being both unsurgical and disappointing in results.

The author prefers to use the leaden mask, in conjunction with intra-nasal splints made of the same material. After reduction the intra-nasal splint is

applied. This somewhat resembles an almond in shape, and is furnished with a wing on either side at the broadest part. The flat portion lies in contact with the septal cartilage, and the curved wings lie against the inferior turbinated body.

The external splint is then fitted; it consists of a single piece of sheet lead, the nose-piece of which is prolonged over the alæ and on to the cheeks to give support; the upper part is continued on to the forehead. The whole is covered with a layer of silk or linen fabric fixed to its surface by means of paste. In dealing with old fractures the parts involved must be very thoroughly broken up, after which they can be moulded at will.

The intra-nasal splints may be removed at the end of four days, and the external splint in six days. Either, or both, may be reapplied if necessary. For controlling moderate hemorrhage, a 5 per cent. solution of antipyrine is recommended.

Entero-anastomosis as a Substitute for Circular Suture.

Braun describes (in the *Archiv für klin. Chirurgie*, 1893, Bd. xxiv., Heft 2) his method of performing intestinal anastomosis. After resection of the bowel the two ends are inverted and a double row of sutures applied. The coils to be united are laid side by side, the closed ends pointing in opposite directions. This, the author considers a distinct advantage over Senn's method, in which the cut ends have the same direction, as, in the latter method, the peristaltic movements have a tendency to force the contents of the bowel against the sutured end. The slight torsion of the mesentery, which unavoidably occurs in Braun's operation, does not exert any unfavorable influence. After the ends of the bowel have been placed in their proper positions they are united by superficial sutures, which include the serous and a part of the muscular coat, the length corresponding to the length of the intended opening—5 to 9 centimetres. Care must be taken not to penetrate the lumen. The blind ends, which should be short, are secured to the adjacent intestine in order to prevent invagination. The next step is to make a cut 4 to 8 centimetres long through the serous and muscular coats down to the submucous coat. The cut is easily made, and permits of the passing of the silk sutures in the posterior margins of the incision with ease and safety. The mucous membrane is next incised, and the redundant edges are removed; the posterior margins, and then the anterior margins, are united with a continuous catgut suture. Finally, the anterior margins of the serous and muscular coats are united with a row of silk sutures, and a few stitches are passed at the extremities of the two rows of sutures.

The time required for the establishment of the actual fistula was from fifteen to twenty-five minutes, and the number of silk sutures employed varied from thirty-four to fifty-four. The author reports ten cases operated on by this method, with five recoveries and five deaths.

The Extirpation of Brain Tumors.

v. Bramann contributes a very interesting article on this subject in the *Archiv für klinische Chirurgie*, 1893, Bd. xlv., Heft 2. Two cases are reported. The first patient was a peasant, aged forty-six years. A year and a half

previously to applying at the hospital he had received a blow on the head. He complained of headache; the left side of the face and left arm were paralyzed, and there was marked weakness of the muscles of the left leg. The reflexes of the affected side were exaggerated, and ankle clonus was present. Hearing and vision were impaired on the affected side. At this time the fundus of the eye appeared normal, although later choked disk of a light degree developed. The patient had frequent attacks of clonic spasms, beginning in the flexors of the left hand and ascending until the arm, shoulder, and left side of the face were involved. Consciousness was preserved during these attacks. During the spasm there was conjugate deviation of the eyes to the left.

The localized paralysis and spasms were thought to be due to a tumor of the brain, which was probably a large one, involving the posterior (movement of fingers) as well as the anterior central convolutions.

The convulsions gradually became more frequent, the pains in the head increased. On one occasion the patient had a syncopal attack, with nausea, vomiting, and slowing of the pulse. Operation was finally decided upon and performed after Wagner's method of temporary osteoplastic resection. The soft parts having been turned up as a tongue-shaped flap, the bone was chiselled through in the line of the incision in the soft parts, and its base broken by means of aspatories pushed along under the surface, and the flap laid back. After removal of the thickened dura, a cystic, fluctuating mass, feebly pulsating, was discovered. It was apparently distinct from the adjacent brain-substance, nevertheless a portion of the cerebral matter was removed as well as the growth. A drainage-tube was wrapped in iodoform gauze and inserted into the cavity, and an antiseptic dressing applied.

Although the wound healed satisfactorily, the patient was not benefited by the operation, and within two weeks convulsions similar to those before described returned. The drainage-track became surrounded by unhealthy granulations, and the part became prominent. The tumor was found to be a myxosarcoma, and the return of the convulsions was ascribed to a recurrence of the growth. A second operation was no more successful than the first. Finally, a third attempt was made to relieve the patient; this time a considerable portion of brain-substance surrounding the growth was removed. The cavity was four to six centimetres deep and as large round as a saucer. The result was eminently satisfactory. Two months after the last operation the patient was able to leave the bed, the choked disk had disappeared, power had returned in the paralyzed leg, the hand and forearm alone having failed to improve. A month later there were no signs of return of the disease. Sarcomata of the brain seem less prone to give metastasis than when these tumors are found in other portions of the body.

A second case was that of an artist who had received a blow on the right side of the head a year before coming to the hospital. At this time he had choked disks, most marked on the right side; diminution of the field of vision, particularly of the right; left-sided facial paralysis; paresis of left arm, and to a less extent of the left leg; also slight loss of power in the right leg. The reflexes were increased on both sides, but were most marked on the left. After being under observation for a week an edematous swelling appeared on the right side of the head. A few days later the patient had a convulsion

affecting the left side of the face and the left arm and leg. The diagnosis lay between abscess and tumor. The choked disks, the absence of symptoms of meningeal irritation, of vomiting, of hebetude, of fever, and of anorexia favored the latter condition.

An operation was performed, when a neoplasm of the brain was removed which weighed two hundred and eighty grammes. A large part of the longitudinal fissure, and even the cribriform plate of the ethmoid bone, were exposed after the removal of the tumor. In order to equalize the intra-cranial pressure and prevent œdema of the brain, the cavity was firmly packed with sterilized iodoform gauze. Convalescence was tedious, but recovery finally took place. The choked disks disappeared, but the power in the limbs was only partially regained. The tumor proved to be a mixed spindle- and round-celled sarcoma.

The author devotes considerable space to a discussion of papillitis. This condition is almost invariably present in cerebellar tumors. Neoplasms in the frontal, parietal, and temporal regions cause a milder grade of the same condition. These variations are explained on anatomical grounds. The venous blood of the fundus is carried by the posterior and short ciliary veins directly into the cavernous sinus, or into the superior ophthalmic veins. The latter empty principally into the cavernous sinus; a portion of the blood, however, is delivered into the anterior facial vein. Any interference with the return circulation, either by pressure upon the vein accompanying the optic nerve or on the sinus itself, will give rise to a venous hyperæmia of the disk.

The sinus is so well protected in its membranous envelope that a great increase in the intra-cranial pressure, or a force acting almost perpendicularly from above downward, as a tumor of the base, is necessary to cause sufficient pressure to give rise to symptoms. An increase of pressure is noted much earlier, however, by the veins accompanying the optic nerve, which lack the complete protection of the dura, and, moreover, rest directly on the base of the skull. Hence, the choked disk in tumors of the cerebrum, especially in those situated near the convexity, is due primarily to compression of these veins; secondarily, to compression of the sinus. The stasis produced by even a remote tumor is naturally more intense the nearer the base of the brain the new growth is situated, and reaches its highest degree when a direct compression of the veins at their point of entrance into the sinus exists. Tumors in the median line, or very large growths, produce bilateral choked disk. In such cases the localization of the growth is very difficult, as the same condition is produced by cerebellar tumors. According to the author, an important point in the differential diagnosis is the presence of hemorrhage and ecchymoses in the retina and choroid. These are only met with in tumors near the base of the frontal lobe, and are never seen in cerebellar growths, no matter how advanced.

The author also offers an explanation of the choked disk occurring in tumors of the cerebellum, and in other affections of the posterior fossa of the skull. The blood from the orbit and bulb flows into the cavernous sinus, thence into the superior and inferior petrosal sinuses. The first, running along a groove in the petrous portion of the temporal bone, empties into the lateral sinus at a point where the latter emerges from the tentorium. The second flows backward toward the jugular foramen; a third, but inconstant

channel, the basilar plexus of Virchow, carries the blood to the anterior spinal plexus. The inferior petrosal and the basilar plexuses lie in shallow bony grooves, and hence are easily compressible. The lateral sinus in that part of its extent occupying the sigmoid fossa of the temporal bone, is less resistant than the portion in the tentorium, which membrane separates more or less completely the posterior from the middle and anterior fossæ of the skull. A tumor or an abscess developing beneath the tentorium, even if small, will produce a more marked increase of pressure than similar affections of the hemisphere. This rise of pressure extends to the brain and its membrane, to the lateral sinus, as well as the other two feebly protected channels. The first result is a stasis in the cavernous sinus, which soon leads to stagnation in the fundus. Tumors of the occipital lobes, by downward pressure on the tentorium, also produce choked disk—as in nearly all cases of tumors of the hemispheres, more marked on one side. Affections of the temporal lobes are very variable in respect to the production of choked disk, and it has been generally supposed that this condition is very rare. Excluding the more common disease of this region—namely, abscess following middle-ear disease—we will find that choked disk is by no means rare, but is not as marked as would be expected from the proximity to the cavernous sinus. The explanation of this condition is found in the fact that the cavernous sinus is exceedingly well protected against lateral pressure both by the enclosing dura and more efficiently by the processes of the tentorium attached to the anterior and posterior clinoidal prominences. The more anterior a tumor of the temporal region is situated, the more marked will be the difference in the stasis in the two eyes. If the tumor is located at the base of the third frontal convolution, compressing the optic tract and its vessels, then we shall have choked disk of the corresponding eye only. It is a fact that the degree of the choked disk does not depend so much upon the size of the tumor as upon its structure and mode of growth. Circumscribed tumors produce more marked symptoms than abscesses and diffused growths, which form at the expense of the brain mass.

In regard to the technique of cerebral surgery the author dwells upon the importance of checking all hemorrhage. Compression with sterile gauze during the operation, and with an iodoform tampon afterward, is of the utmost importance in preventing œdema. Large cavities should not be packed with iodoform gauze exclusively, as there is danger of intoxication. Opening of the skull simply to relieve pressure is condemned by the author.

Perforating Carcinoma of the Scalp.

Braun (*Archiv für klin. Chir.*, 1892, Bd. xlv., Heft 1) reports a case of cancer of the scalp, originating from scar tissue, in a child twelve years old, and growing rapidly until the fourteenth year, when it came under his observation. It was then ulcerated and pulsating. He decided to remove it in successive operations, disinfecting the wound as much as possible before removing the inner portion of the growth, and waiting to close the external wound until the inner portion had healed without any sign of return *in situ*. The operation showed that the growth involved not only the skin, but the bone, dura and pia mater, and the brain substance itself. These diseased

portions were removed in the successive operations, fine needles with catgut sutures being passed under the arteries of the pia mater and then the ligatures tied, while the diseased portion of the brain substance was removed by the knife or the actual cautery. After the removal of one return of disease *in situ*, the wound was closed by an osteo-plastic operation, six months after the last sign of recurrence. The patient made a complete recovery with no symptoms of further disease.

Choledochostomy.

Terrier (*Rev. de Chir.*, Fév. 1893), after defining this operation as the permanent opening of the ductus choledochus, gives a critical and detailed study of the only four cases which have been operated upon. None of these were premeditated operations, nor was the true nature of the tumor diagnosed, except in one case, before the autopsy, and in this case the report is so meagre that it is impossible to determine the surgeon's reason for the establishment of the fistula, or the condition found present in the choledochus. The author concludes from the cases studied, that the enormous dilatation of the ductus choledochus appears to accompany frequently the infection of the biliary passages, which complicates in all cases any operation and renders it very grave. As a consequence of the rarity of cases in which this operation is justified and in which it has been performed, it is impossible to formulate rules of procedure until other observations, with the results of intervention, have been published.

The Treatment of Tuberculous Joints with Iodoform Oil.

The *Centralblatt für Chirurgie*, 1893, No. 3, reviews the monograph of De Vos on this subject. The work embraces the results obtained at the clinic and polyclinic at Leyden, covering a period of a year and a half. The iodoform was prepared in the following manner: Ten grammes of the powder were placed in a black glass bottle and covered with a solution of corrosive sublimate 1 : 1000, which was allowed to remain four days; the fluid was then decanted and the iodoform washed repeatedly with fresh distilled and boiled water; to this aseptic iodoform was added 100 grammes of olive oil which had been previously boiled ten minutes and cooled down to 30° C., and repeatedly shaken.

For injections into the hip-joint the author recommends that the needle should be fourteen centimetres long; when the injection is made into bone the needle is provided with a stylet. After experimenting on cadavers the author recommends the following methods for injecting the different joints. For the shoulder-joint: adduction of the arm, with the forearm bent at a right angle across the body; the needle is entered one centimetre behind and below the point of the acromion. For the elbow: a point is selected external to the olecranon, the needle being entered between the head and tuberosity of the radius. The wrist: the point of election is, on the radial side, the most dorsal corner of the tabatière; on the ulnar side, a place on the upper anterior course of the pisiform bone. For the hip, the author's method is as follows: the mid-point between the anterior superior spine of the ilium and the tuberosity of the pubes is designated; from a point the breadth of the patient's thumb

external to this a line is drawn downward to the external point of the trochanter major; this last line is divided into four equal parts; the first dividing-point from the trochanter is the point at which the needle is to be entered. It is necessary that the limb should be straight and the inner border of the foot should be vertical. If the position of the trochanter is out of the Roser-Nélaton line the needle must be carried a corresponding distance in the same direction. For the knee: at the point between the upper end of the tibia and the ligamentum patellæ. For the ankle: on the outside of the foot closely anterior to the point of the malleolus in a direction toward the calcaneum.

It is recommended to make the injections slowly, occupying about ten minutes for the introduction of 10 grammes. For adults, 1 gramme of iodoform may be used with safety. If no reaction appears, the second injection is to be made in eight days. The intervals may gradually be made longer.

Massage and passive movements are not to be used after the injections, as this might produce iodoform intoxication or disseminate the tubercular infection. Moderate active movements are recommended. Some of the symptoms of iodoform intoxication are dimness of vision, retinal hemorrhages, and a papular retinitis. The author considers iodoform oil better than the glycerin mixture for theoretical reasons. Of the cases reported, the duration of treatment varied between 9 and 325 days; the number of injections from one to twenty; the amount of iodoform used in a case from 2 to 67½ grammes; the amount of oil used from 10 to 385 grammes. Result, 72 per cent. entirely cured. Of the 68 cases, 60 were clearly joint tuberculosis. Only 2 cases of recurrence were observed.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

J. SOLIS-COHEN, M.D.,

OF PHILADELPHIA.

Œsophagoscopy.

Dr. Ludwig Löwe, of Berlin, describes (*Deutsche med. Wochenschr.*, 1893, No. 12) a method of œsophagoscopy which he has devised, differing from the various methods practised by Semeleder, Stoerk, Waldenberg, Morell Mackenzie, and Mikulicz. The œsophagoscope and the images rendered are illustrated by cuts, to which the reader must be referred for intelligible details.

Abscess at the Base of the Tongue.

An instance of this rare lesion is reported (*Annales des Mal. de l'Oreille, etc.*, 1892, No. 12) by L. Hélary from the service of Prof. Gouguenheim.

It was attributed to apparent injury from a morsel of bone during glutition. Topical pain, dysphagia, pronounced fever, difficult respiration, and swelling on the left side of the neck ensued. Laryngoscopic inspection revealed a small tumor on the left side of the base of the tongue, extending to the central portion and concealing the glosso-epiglottic fossa. While preparations were being made to incise the abscess it underwent spontaneous rupture with discharge of about a quarter of a tumblerful of fetid sanious pus. Immediate relief followed with prompt subsidence of all symptoms.

Syphilis of the Lymphoid Nodules at the Base of the Tongue.

The lymphoid nodules in the base of the tongue, inelegantly termed lingual tonsils and fourth tonsils by writers on diseases of the throat, have been made a special subject of study in cases of syphilis by Dr. Seifert, Würzburg (*Münch. med. Wochenschr.*, 1893, No. 6), who finds that they are frequently diseased in secondary, tertiary, and hereditary syphilis. His statistics show that they are involved in the majority of cases of constitutional syphilis affecting the pharynx, and especially the true tonsils. First, there is congestion and tumefaction, then development of papules, and, finally, ulcerous destruction of these papules. There are no subjective symptoms in the first stage, and but little in the second stage, while the ulceration in the third stage produces marked dysphagia.

The Rhinometer.

Dr. Edward Blake (*Journ. of Lar.*, 1893, No. 3) describes a thin graduated spatula for use in probing the nasal passages, and he claims that it serves to diagnose rapidly the various obstructive diseases of the naso-pharynx.

The Condition of the Nose in Typhoid Fever.

This is another of Dr. Paul Tissier's admirable original contributions (*Annales des Mal. de l'Oreille, etc.*, 1893, No. 3) to clinical science. The result of eight detailed observations are summed up as dryness, anæmia, and necrosis of the mucous membrane during the periods of invasion and activity, with return of secretion and vascularization at the approach of convalescence. Superficial erosions at the anterior portion of the septum constitute the anatomic substratum of the epistaxis.

Secondary Syphilis of the Nasal Passages.

Dr. Paul Tissier (*Annales des Mal. de l'Oreille, etc.*, 1893, No. 2) reports a series of twenty-five observations recently made in females with secondary manifestations in the skin or in the mucous membranes. The results are summed up as vermilion-colored erythema, followed by erosions, and the possible production of synechiæ between the septum and the turbinate bodies. He emphasizes the necessity of distinguishing the secondary manifestations of acquired syphilis from the coryza so often observed in the precocious form of hereditary syphilis in the newborn subject.

Morbid Growths in the Nasal Passages.

Dr. Robert Dreyfus, of Strasburg (*Wien. med. Presse*, 1892, No. 36), reports an instance of carcinoma in the nasal passages of a woman sixty-four years of age, who had suffered some thirty years with copious purulent nasal catarrh. Fetid secretions were discovered in both nasal passages, and a number of smooth red tumors, the size of peas, in the right middle meatus in the region of the *hiatus semilunaris*. The patient had for a long time been unable to open the mouth beyond a limited extent, so that posterior rhinoscopy and palpation of the rhino-pharynx were impracticable. For some time there had been pains in the right frontal and occipital regions. These growths were removed, and dead bone was curetted from the ethmoidal, sphenoidal, and frontal sinuses. Anæsthesia of the right side of the jaw, of the cheek, and of the lips soon ensued. Other masses were removed from the roof of the nasal passages, and new growths became developed on the floor of the nose. The general condition became worse, with deafness and diminished vision of the left eye, with congestion of the conjunctiva and dilatation of the pupil, indicating that the tumor had perforated the uppermost portion of the septum and pressed upon the optic nerve of the opposite side, as was demonstrated by the physical exploration and injection. Symptoms of purulent meningitis, with almost continuous fever, became manifest, and the patient died after a comatose condition lasting eight days. An autopsy could not be obtained. In all probability, the carcinoma originated in the nasal mucous membrane in the region of the ethmoid bone, whence it perforated the bones and extended into the cavity of the cranium.

MM. B. Lyonnet and C. Regaud (*Annales des Mal. de l'Oreille, etc.*) report a case of carcinomatous growth in the rhino-pharynx of a man thirty-seven years of age, which invaded the sphenoid bone, produced paralysis of all the cranial nerves of the left side, except the olfactory and optic, and terminated fatally by meningitis.

Electric Illumination in Abscess of the Maxillary Sinus.

Dr. J. Garel (*Annales des Mal. de l'Oreille, etc.*, 1893, No. 2) describes a complementary diagnostic sign of the presence of fluid or other substance in the sinus, in the absence of the perception of light on the affected side at each making of contact when the eyes are closed.

The Anatomical Relations of the Frontal Sinus and its Orifice.

Dr. A. Hartmann, of Berlin (*Wien. med. Presse*, 1892, 36), contends that there is no regular naso-frontal canal, but that the frontal sinus extends as far as the anterior end of the middle turbinate bone, and opens freely through a wide fissure into the outer portion of the nasal meatus. Usually the portion lying beneath the turbinate bone is narrowed by ethmoidal cells which may project from all its walls. These cells leave a median space free, which may be designated as the *ductus naso-frontalis*. It opens, as a rule, in the anterior

furrow of the *infundibulum*, and thus permits the passage of a properly bent probe into the sinus when access is free from the middle meatus. This access may be rendered difficult—1, by various distentions of the anterior ethmoidal cells; 2, by great development, coiling, or cavernous formations in the middle turbinate; 3, by immoderate prominence of the *processus uncinatus*; 4, by great prominence of a *bulla ethmoidalis*, which fills the *infundibulum*, and may thus wholly cover the orifice. Despite these numerous hindrances, the frontal sinus may be probed in nearly 50 per cent. of all cases. In most cases of abscess of the frontal sinus, cure may be effected by syringing or removing obstructions to the natural flow of the secretions without any necessity for opening the sinus from the exterior.

Injudicious Treatment of the Nose and Throat as a Source of Disease in the Middle Ear.

Dr. Thomas Barr, of Glasgow (*The Lancet*, 1892, No. 3616) discusses the injurious results of improper recourse to nasal irrigations, incandescent and other cauterizations, with citations of injuries recorded by various observers; he concludes with some precautionary suggestions as to the methods to be pursued when such procedures are practised.

[This article is worthy the commendation of all specialists in affections of the nose and throat, and would be the means of saving hundreds, if not thousands, of sufferers from injury, if learned by heart by specialists who know little of general medicine.]

Even judicious treatment is occasionally followed by similar misfortune. Thus Dr. Wm. C. Braislin, of Brooklyn (*New York Medical Journal*, 1893, No. 744) reports a unique case of purulent otitis media following amputation of the uvula of a tuberculous subject. While it is intimated that the removal of the uvula was the direct source of the otitis media, which followed so closely as to make it seem probable that the disorder would not have occurred had no operation been performed, the possibility of infection by the engorgement of sputa in the Eustachian tube is acknowledged, the more probable as the suppuration in the ear was tuberculous in character.

Cardiac Irregularity in Rhino-pharyngeal Disease.

In a paper upon "Irregular Heart," Dr. Sansom (*The Lancet*, 1892, No. 3616) presented some illustrative cases tending to show that a reflex from the rhino-pharyngeal tract and from the neighborhood of the auditory mechanism was often a potent cause of cardiac irregularity. He thought that the nasal and aural troubles were the commonest reflexes which started the cardiac derangement. Dr. Woakes testified that heart perturbation or cardialgia was a common consequent on nasal disease.

Mycosis of Pharynx and Larynx.

Dr. Labit (*Rev. de Lar., etc.*, 1893, No. 5) reports a case of generalized mycosis of the pharynx, rhino-pharynx, base of the tongue, and larynx in a

female patient twenty-eight years of age. Though not completely cured when last observed, it was treated satisfactorily by energetic frictions three or four times a week with a solution composed of iodine 4.25, potassium iodide 70, zinc chloride 45, and distilled water 25 parts, according to the formulæ of Nabias and Sabrazès.

Demonstrations of Enlarged Laryngoscopic Images.

Prof. Gustav Killian, of Freiburg (*Münch. med. Wochenschr.*, 1893, No. 6), describes and illustrates a method of projecting laryngoscopic images upon a screen for class and other demonstration. The image is received upon a prism, whence it is deflected to the screen. Considerable skill in manipulation is required, but satisfactory images magnified five times can be projected if proper pains be taken. For the details and the diagrams the interested reader had better consult the original article.

Photographs of the Larynx.

Dr. A. Nusehold, of Berlin (*Deutsche med. Wochenschr.*, 1893, No. 12), describes and depicts a new apparatus, with illustrations of its results. The details can hardly be comprehended in a short extract, and the interested reader is referred to the original. The reproductions in the copy seen by the writer are hardly equal to those produced by Dr. French, of Brooklyn.

Artificial Larynx.

Dr. Julius Wolff, of Berlin, exhibited at the Congress der Deutschen Gesellschaft für Chirurgie (*Wien. med. Presse*, 1892, No. 36) a patient wearing a modified Bruns larynx, which remained free from collections of mucus, and which enabled the patient to modulate his voice so that he could even sing correctly. This apparatus, which is not described, elicited the highest encomiums from Löbker and from Bruns.

Goitre.

Arguing from an incident in his own practice, Prof. Julius Wolff (*Deutsche med. Wochenschr.*, 1893, No. 11) considers that sudden deaths during operations upon the enlarged thyroid gland, or shortly thereafter, are sometimes due to accumulations of mucus in the pharynx, which prevent sufficient passage of air through the compressed or flattened trachea, and thus produce asphyxia. He recommends inverting the patient and swabbing the pharynx out as a quicker and surer means of rescue than tracheotomy, which is so often ineffectual. The various causes to which this not infrequent accident have been attributed are mentioned and accredited.

OTOLOGY.

UNDER THE CHARGE OF

CHARLES H. BURNETT, A.M., M.D.,
AURAL SURGEON, PRESBYTERIAN HOSPITAL, ETC., PHILADELPHIA.

A Case of Extensive Cholesteatoma of the Mastoid Process Without Local Signs of Inflammation; Death from Thrombosis of the Lateral Sinus and Meningitis.

Dr. Harry Friedenwald (*Archives of Otology*, vol. xx. p. 1) has recorded the history of a case of this kind—that of a man who had had otorrhœa since childhood, after measles. At one time in childhood he had a swelling behind his ear; this was lanced and pus evacuated.

May 17th. Pain in left ear and dizziness. Could not work. No elevation of temperature; pulse 60. Mastoid not tender nor swollen. A spot above line of auditory canal was somewhat tender on deep pressure. Later, however, evanescent. In a month he was better under local treatment of the ear, extraction of polypi, and antisepsis.

One month later (May 25th) patient had a long chill, followed by headache; next day the same thing. Diarrhœa. Temperature normal. From this time on, for two weeks, gradually increasing thrombotic, pyæmic symptoms, rigor, chills, sweating, and fluctuating, elevated temperature—100–104.[1] He complained of great pain in his head. Cerebral abscess, and not thrombosis, suspected. No tenderness in line of jugular vein.

June 7th. Some numbness in right hand. Abscess believed to be in left temporal lobe.

Operation, but no abscess found in the temporal lobe. Post-mortem examination revealed a greenish layer of pus covering the convex surface of the left frontal and parietal lobes, seemingly situated in the pia mater. Firm clot in lateral sinus.

Thrombosis of the Sinuses.

Hansberg, of Dortmund (*Annales des Maladies de l'Oreille, etc.*, 1892), has written an article based upon two cases of suppurative disease of the middle ear. Boy, sixteen years old; chronic otorrhœa from infancy, both ears; never any pain; much treatment from specialists (no excision, however). Suddenly, violent pains occurred in the left ear. Hansberg called in on third day; he found high fever, frontal headache and earache; 39.6° C.; pulse, 110 (malleus present in perforated membrane). No caries found by probe in tympanic cavity. Deafness very great. Mastoid normal. Pain when pressure is made in retro-maxillary region, which is not swollen. Fever continues to fifth day, when vomitings occur; violent headache; pupils

[1] These are symptoms of meningitis and thrombosis (pyæmia) rather than of abscess of brain.—Ed.

continue symmetrical; no ophthalmic examination. Ninth day: Violent chills, then temperature 41.5° C. Tenth day: Chills, semnolence; delirium; no mastoid symptoms; *i. e.*, no swelling, no pain on pressure; no tenderness in retro-maxillary space now; no swelling in line of internal jugular vein. After consultation with former physician it was decided to open the mastoid. Eleventh day of disease: Mastoid chiselled open; bone healthy externally, but after a few strokes of chisel fetid pus escaped in large quantity. Later a discolored spot in upper part of inner mastoid surface was incised, and quantity of fetid pus escaped from sigmoid sinus. Twelfth day: Temperature, 38.8° C.; evening, 38.1° C. Patient feels better; no headache. Thirteenth day: Temperature same. For five days no fever; ear sweet; little discharge. Seventeenth day: Evening, 39.8° C.; violent pains in abdomen; tender on left side; no swelling. Eighteenth day: Pains in abdomen continue. Nineteenth day: Dry cough. Twenty-first day: Chill; pulse 144; 36.4° C., evening. Twenty-second to thirtieth day: Chills, fever; pain in left shoulder. Thirty-eighth day to forty-fifth day: Chills, fever, gradual failure; pain in abdomen; vomitings; finally, temperature below normal. Pain in abdomen and shoulder continue; consciousness remained. Death on the fifty-seventh day.

Autopsy. Clot entirely filling longitudinal sinus; confluent and extending into left transverse sinus as far as the jugular foramen, where it ceased; in the superior petrosal sinus also a thrombus. One and one-half centimetres from the torcular Herophili forward and to the left there was a round hole in the dura mater, 8 mm. wide, which leads into the thrombosed transverse sinus. The opening in the dura mater corresponded furthermore to an opening in the occipital bone. Metastatic abscess in lung and abdomen.

A Successful Case of Ligature of the Internal Jugular Vein and Trephining Lateral Sinus in an Ear Case, whilst the Symptoms of Pyæmia were Well Pronounced.

H. H. Clutton (*British Medical Journal*) records the case of a boy, ten years old, who had otorrhœa in the right ear for six months after the grippe in 1891. Otorrhœa ceased upon supervention of earache, headache, and marked pyæmic rigor, and variations in temperature from 97°–105° F. Metastatic suppuration of ulna and ankle also present. Tumefaction over the jugular; vein thickened; the latter was opened, and a loose clot found. Three days later, trephine over lateral sinus, and pus found in it; syringed out by stream from the sinus down through jugular vein and out at opening in the neck, removing broken-down clot and pus. Slow but uninterrupted recovery.

Pyæmia of Otitic Origin successfully treated by the Removal of a Putrid Thrombus from the Jugular Vein and Lateral Sinus.

Dr. Parker, of Liverpool (*Brit. Med. Journal*), has recorded the very interesting case of a man having chronic otitis media suppurativa since he was fourteen years old. Violent ear pains for a week before he was received into

hospital. For three days frequent chills and vomitings; complete insomnia; temperature 40.5° when received into hospital. Vertigo on rising; stupor, with occasional delirium. Fetid pus flowed from left ear. Painful swelling in the neck on a level with the upper extremity of the internal jugular vein; mastoid intact. Mr. Parker now diagnosed obliteration of the jugular by thrombus extending from lateral sinus. The symptoms indicated sinus-phlebitis.

Pyæmic symptoms; chills and fever increasing for three days; removal of thrombus was performed. Incision fifteen centimetres long, from mastoid along the line of the left jugular vein. The jugular was obliterated by a clot, from its exit from the skull to the anastomosis with the facial vein; the latter also thrombosed for three inches. Thrombotic portions resected. Mastoid trephined and lateral sinus opened, giving vent to fetid odor; it was filled with a grayish, purulent matter. Sinus opened and scraped. All exposed parts washed with sublimate solution. Hemorrhage from sinus stopped by antiseptic wax. Next morning patient read newspaper and remained well two days. Then mastoid swelled, temperature went up to 39° C. Patient became stupid; the tampon of wax was removed and pus allowed to escape. In sixteen days patient was well under antiseptic washings, and has remained so.

HISTOLOGICAL CHANGES IN BOTH PETROUS BONES DUE TO CHRONIC PURULENT OTITIS MEDIA FOLLOWING SCARLATINA; THREE YEARS LATER, MENINGITIS OF CEREBEAL BASE AND CONVEXITY; DEATH.

IN May, 1886, scarlatina and naso-pharyngeal diphtheria in a child five years old. On the fourth day intense pain in both ears, followed immediately by purulent discharge from both ears. At the outset the child became profoundly deaf, and remained so. Immediately after the scarlatinous disease had passed by, the child complained of vertigo, and manifested a markedly staggering gait. For a long time the child had earache and headache.

At the time of the beginning of the last illness, January, 1889, there was a fetid discharge from the ears, which, however, ceased in the right ear, but continued in the left for a few days longer. At this time the temperature fell from 39° and 40° C., to 38°, and thus continued with little variation for six days. At the end of this period the temperature rose to 40.4° C., and purulent discharge came again from the left ear and continued until the child's death. The discharge reappeared in the right ear for only one day, and then stopped again. Temperature remained at 39° C. until a short time before death, when it rose to 40° C.

Complete deafness, somnolence, and unconsciousness. Constipation and sudden screaming in sleep, clutching at her head, vomiting, gritting of the teeth, left-side paralysis of extremities, twitching of the facial muscles, stiffness of the neck, retention of urine, involuntary defecation, abolition of tendon- and skin-reflexes, preceded by general hyperæsthesia. It was not possible to fully straighten the knee on account of the tense flexion at hip-joint. On the left side very intense podalic clonus. Increasing somnolence. For a day before death brownish pus flowed from the nose. Belly indolent, sunken. Pulse varied from 100–120, irregular. With lower temperature the

pulse fell to 80–100. Finally the pulse rose to 140–160. The respirations previously accelerated now sank to 12; Cheyne-Stokes respiration occurred occasionally.

Macroscopic examination of both petrous bones revealed a highly sclerotic state of both tegmina tympanorum; mucous membrane of both attics thick and red. Purulent meningitis of convexity and base; hydrocephalus internus; cavity containing cheesy mass in right bronchus; disseminated tubercle in both lungs; numerous tuberculous deposits in spleen and kidneys; disseminated tubercles in the liver.—S. Moos, *Zeitschrift für Ohrenheilkunde.*

Purulent Brain Deposits, Phlebitis and Thrombosis of the Cerebral Veins and Sinuses following Ear Disease.

Frank Allport, M.D., of Minneapolis, Minn. (*Journal of the American Medical Association*), has shown much industry in collecting the data, bringing together notes of 169 cases of the above-named nature. Conditions admitting to the list are mentioned as follows:

1. The patient must have had an ear difficulty resulting in intra-cranial trouble, death, and an autopsy.

2. The patient must have had an ear difficulty resulting in intra-cranial trouble, and the intra-cranial disease exposed by operation.

Men, 86; women, 46; sex not stated, 37; equal 169. Average age, nineteen to twenty years. Most frequent ages involved, seventeen to twenty-six years. Right ear, 81; left ear, 69; ear not stated, 19; equal 169. Cerebro-aural affection dependent upon chronic otorrhœa, 118; cerebro-aural affection dependent upon acute otorrhœa, 10; not stated, 41; total, 169.

OBSTETRICS.

UNDER THE CHARGE OF

EDWARD P. DAVIS, A.M., M.D.,

PROFESSOR OF OBSTETRICS AND DISEASES OF INFANCY IN THE PHILADELPHIA POLYCLINIC; CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE WOMAN'S MEDICAL COLLEGE; CLINICAL LECTURER ON OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE; VISITING OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

Assisted by

W. H. Wells, M.D.,

ASSISTANT DEMONSTRATOR OF CLINICAL OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE, PHILADELPHIA.

A Case of Cæsarean Section for Osteomalacia.

Seeligmann (*Münchener medicinische Wochenschrift*, 1893, No. 14, p. 273) describes a patient, who had had seven children and five abortions. Last child delivered by version and extraction, dying soon after birth. Patient was in a miserable condition, being confined to bed before the pregnancy;

was deformed, having sustained a fracture of the upper third of the right femur. A considerable kyphoscoliosis of the breast existed, accompanied by a lordosis of the lumbar vertebræ.

Pelvic measurements showed: Between the anterior superior spines, 24.5 cm.; between crests, 31 cm.; between trochanters, 32 cm.; conjugata externa, 19 cm.

Internal examination proved it to be a typical osteomalacic pelvis of the shape of the figure 8. The pubic arch showed the characteristic beak form.

Cæsarean section being decided on, the operation was done in the patient's own room, on a table. After delivering the child, the uterus and appendages were removed, considerable hemorrhage being encountered. A thermocautery was used on the stump. After the broad ligaments, which were somewhat torn, had been stitched, the peritoneum of the stump was united to that of the belly, and the remaining wound closed by silk sutures, which included peritoneum, muscles, and abdominal skin. A broad transverse needle secured the extra-peritoneal stump, over which were laid broad adhesive strips. The operation lasted fifty minutes. The child was a healthy male. On the fourth day the infant was attacked with ophthalmia neonatorum, which yielded to a 2 per cent. solution of silver nitrate. The mother's abdominal wound united by first intention.

Five days after the operation, in order to relieve, if possible, the osteomalacia, the patient was placed in two Volkmann's extension bands, these being attached to each lower extremity, and counter-extension being made by bands under the arms. Before putting on the bands the measurements were as follows: Whole length (patient horizontal), 125 cm.; from left trochanter to sole of foot, 89 cm.; right trochanter to sole, 84 cm.; trochanter to head, 36 cm. Weights made of sand-sacks were employed, but not constantly.

After six weeks the bands were taken off and the following weights attached: To upper left extremity, 9½ pounds; right inferior extremity, 11½ pounds; under arms, 11¾ pounds.

The final result was as follows: The woman had become 18 cm. longer. The right inferior extremity was nearly as long as the left. After taking away the extension bands, the patient was taken out of bed and stood up, the increase of size remaining complete. Pain and swelling of joints have disappeared, and internal examination shows the configuration of the pelvis notably improved. The diagonal conjugate, formerly 8 cm., is now 9 cm. The kyphoscoliosis has straightened, as well as the lordosis. Power of movement increased, so that she can now attend to her household duties, only requiring a thin stick to assist her in walking. Ovaries and uterus were normal on examination.

Fœtal Ascites a Cause of Dystocia in Labor.

Parisot (*Archives de Tocol. et Gyn.*, 1893, No. 4, vol. xx. p. 291) relates a case of Prof. Herrgott's, in which a II-para, of syphilitic history, was delivered prematurely of a dead infant. On her admission the extraordinary size of the abdomen, out of all proportion to the time of her pregnancy, was noticed in the patient. Palpation did not give clear results, and on ausculta-

tion the heart-sounds could be heard on the right, but were heavy, obscure, and intermittent. Delivery was accomplished by forceps, great traction being necessary, and during the birth the head was torn off. The abdomen of the fœtus was of large size, measuring 19 cm. in diameter on a level with the umbilicus. It was punctured and the liquid drawn off. The genito-urinary organs had no orifice and the anus was imperforate. The bladder had no outlet and was greatly distended.

The author also relates a case of his own; a III-para, of specific history, was delivered by forceps after a labor of six and half hours. The child died at once.

On admission, abdomen was markedly globular, and the size out of proportion to the time of pregnancy. Heart-sounds were heard clearly on the left side. Vaginal examination showed membranes intact, and head strongly engaged. On rupture of the amniotic sac only a small quantity of fluid escaped. Although the head was small and easily delivered by forceps, great difficulty was encountered in the extraction of the trunk. The abdomen was enlarged, measuring 45 cm. in circumference at umbilicus, and was accompanied by a general infiltration of the cutaneous tissues and a secondary enlargement of the neck. A wound 5 cm. long, involving skin and cellular tissue, over larynx. The patient's pelvis was normal in size. The placenta was found to be greatly enlarged, weighing 1600 grm. Length, 26 cm.; width, 21 cm.; thickness, 4 to 5 cm., and on section it was found to have undergone granular and fatty degeneration.

The autopsy on the fœtus revealed the following facts: Weight, 2100 grm.; head small; abdomen contained 240 grm. of a reddish liquid; liver three times as large as normal, weighing 190 grm., measuring 11 by 6 cm. On section, it showed a yellow-brown color with scattered reddish-brown spots. Spleen and kidneys enlarged markedly. Lungs normal. The writer, in concluding, remarks that syphilis is the most common cause of ascites in the fœtus.

Intestinal Complications of Pregnancy and Labor.

Budin, in the Obstetrical Clinic at Hôpital de la Charité (*Semaine Médicale*, 1893, No. 19, p. 141), in a lecture on the "Relation of the Uterus to the Intestines, Viewed from a Clinical Standpoint," relates a number of cases where, a few days after labor, a woman became feverish with abdomen tympanitic or slightly tender, but without any inflammation of uterus or appendages. The large intestine was found distended, especially the sigmoid. A purgative and enema being administered, there came away vast quantities of feces, and the symptoms all disappeared. He regards the above as a stercorœmia, or auto-intoxication of intestinal origin, and not to be confounded with puerperal septicœmia. He claims, also, that there is a peritonitis of intestinal origin due to the bacterium coli commune passing into the peritoneum, and that an examination of the liquid contents of the abdomen shows this bacillus and not streptococci. He quotes the case of a woman who died of abortion following retroversion, who had been curetted, and fetid fragments withdrawn from the uterus; these gave a pure culture of bacterium coli commune, and these were also found in her peritoneum,

uterus, heart, blood, and pus. He also claims obstinate constipation and fecal accumulation as a cause of abortion and of obstinate vomiting. If umbilical hernia appears during gestation, it never becomes strangulated, as the ring widens as the uterus enlarges; also, if inguinal or crural hernia be present, the uterus pushes up the intestines and thus they are not gripped. Tympanites or a gluing together of the intestines may simulate pregnancy.

In cases of rents of the genital canal, loops of small intestine may descend occasionally, and have been removed as the cord.

One Hundred and Twenty-four Symphysiotomies.

Varnier, in the *Annales de Gynécologie et Obstétrique*, 1893, t. xxxiv. p. 241, sums up the present status of symphysiotomy by tabulating 124 cases as follows:

Mothers: 112 recovered, 12 died.

Children: 92 lived, 32 died.

Of the mothers, 8 died from causes clearly disconnected with the operation. Of the remaining 4, 1 died of septicæmia; 1, of sphacelus of the vulva and vagina; 1, of cellulitis and peritonitis, due to the use of a saw and to forcible introduction of hand and arm in order to obtain version; 1, of hemorrhage and shock of operation and of lacerations of the perineum, vulva, and bladder.

In regard to the infant mortality, 5 cases should be eliminated, where the operation had been done in place of embryotomy; 119 cases of living children remain. Of the 27 remaining deaths, 7 were due to causes not results of operation; 11, to mishaps with forceps, or in version; 7, in succession to incomplete section; 1, to prolonged extraction due to distortion of the right arm; 1, to cerebral lesion due to prolonged pressure on the head. Conclusions:

1. The operation properly performed does not entail immediate or consecutive disorders of the sacro-iliac synchondroses.

2. In pelves not *extremely* contracted, the enlargement resulting from the operation is sufficient for a living child at term to pass through.

3. The finding and cutting of the symphysis presents no great difficulties; only three cases out of 125 are reported where the operation has failed in this.

4. No especially dangerous venous hemorrhages are apt to be encountered.

5. The anterior rents of soft parts may be avoided if the accoucheur remembers that after section the inferior strait is oval transversely and not of the normal shape.

Ectopic Gestation with Retained Fœtus.

Gottschalk, at a meeting of the Société de Médecine Interne (*Médecine Moderne*, 1893, No. 25), presented a very rare and interesting preparation. A woman, fifty-four years old, was delivered at twenty-three years, and again became pregnant. In due time pains came on, but delivery did not advance. An extra-uterine pregnancy was diagnosticated, and the woman left to her fate. After eighteen weeks in bed with peritonitis she recovered, and although menstruation again appeared, she never again became pregnant. One could feel through the abdominal walls a tumor as large

as a head. After five years of distress, the abdomen was opened by a longitudinal and transverse incision and the tumor removed. The placental insertion was on the broad ligament of the left side. She recovered without complications. The tumor presented was a fœtus, still well preserved, covered by a thick calcareous envelope.

The Obstetrical Society of Paris.

At a meeting of the Société Obstétricale de France (*Semaine Médicale*, 1893, No. 13, p. 157) Wallach discusses rigidity of the os uteri during labor. He had examined its tissues and found only œdema, with little or no alteration of its fibres, and regards this as due to pressure. It is often the preparatory step to tears of the neck.

Concerning pathological induration of the uterus, M. Guerniot recommends Cæsarean section if the neck be largely involved and the child living. If it be dead and pregnancy but little advanced, and especially if a part of the neck remains healthy, one hesitates to proceed to extremities. He then uses small incisions, widening thus a passage for the child as needed, cutting all restraining bands. These cuts he finds to be but slightly dangerous. In cases of advanced carcinoma, Porro's operation is indicated.

During the discussion of vicious insertion of the placenta, it was stated that this may be marginal at first and become central as the os stretches, the placenta not separating to a corresponding degree. Insertion is complete when the cotyledons occupy the area of the uterine neck, dilatable or dilated. Forty cases have been observed, with eight autopsies. In this condition the neck is especially supple, due to the excess of vascularity; tears are rare. Prognosis for the child in this affection is bad; about 80 per cent. perish. The maternal mortality is 35 per cent. Treatment consists of tampons in the vagina, or Braxton-Hicks version; this is sometimes difficult.

M. Chambrelent discussed some experiments on the passage of strepto- and other cocci and the bacterium coli through the placenta—rabbits being used. The bacteria traversed the placenta, and were found in the embryo and fœtus at various periods of gestation. No alteration of the placenta seemed necessary for this change.

During the discussion of the anatomical lesion of auto-intoxication during pregnancy (*op. cit.*, p. 158) Bouffe de Saint-Blaise stated that he had examined the organs of thirty-one women dying from eclampsia, and found in all what he believed to be the characteristic lesion of this disease, namely, congestion and hemorrhage of the terminals of the portal vein. The microscope showed capillary dilatation or true apoplectic foci with necrobic patches. These seemed to indicate an intoxication proceeding from intestinal or microbic origin. The blood is surcharged with poisons. As therapeutics, chloral and chloroform are recommended; it is also useful to inject artificial serum into the veins and cellular tissue.

Riviere (*ibid.*) reports 16 cases of curetting—8 after abortion, 8 after confinement. Of three failures, 1 was for eclampsia, 1 in uterine perforation due to an attempt at abortion, 1 of intervention on the fourteenth day. He had 13 successful cases. Operation was indicated in three cases of abortion; hemorrhage was present, and in other cases septicæmia. In the first three

cases he curetted without previous tampon. In septicæmia, if irrigation and injections fail, he curettes, and afterward inserts a pencil of iodoform. He uses a sharp curette. Care should be taken to avoid perforating the uterus.

Placenta Prævia Lateralis.

Wilbur (*Boston Medical and Surgical Journal*, 1893, vol. cxxviii., No. 18) reports the case of a multipara, thirty-five years old, who, when three months pregnant, began to have increasing uterine hemorrhages, at first unaccompanied by pain. Ether was given, and after manual dilatation of the os, version was performed and the fœtus extracted rapidly. The placenta was felt in the left side at the margin of the inner cervical ring. Hemorrhage during and after the operation was considerable. Subcutaneous injections of stimulants were resorted to, and a large enema of salt solution was given. Patient recovered entirely.

A Case of Cæsarean Section for Rhachitic Deformity; Recovery of Mother and Child.

Griffith (*British Medical Journal*, March 25, 1893) reports an interesting case of the above-named operation:

A primipara, twenty-six years old, in labor about twenty-four hours. One paternal uncle and one sister were deformed by rickets. The patient, on admission, was rhachitic, with marked lordosis of the pelvis, which presented the following measurements:

Crests,	9¾ inches.
Spines,	9¼ "
Conj. ext.	5½ "
Conj. diag.	3 "
Conj. ver.	2½ "
A. P. diam.	2¾ "

The sacrum was found, as in all cases of severe rickets, convex from above downward and from side to side, as well as somewhat oblique.

The operation presented no especial difficulties. The hemorrhage, which was slight, was controlled by two fingers' pressure of the left hand. Silver wire was used for the sutures, the stitches being passed through the whole thickness of the muscular wall; twelve thick sutures in the body, and four thinner ones in the upper part of the cervix, all placed close together and secured by twisting. The ends were cut so short that, on passing the finger along the wound, no ends of the wire could be felt. The oviducts were ligated in their middle with fine silk. No irrigation or sponging was necessary, and the abdominal wound was closed with silkworm-gut. Both mother and child made a perfect recovery.

From the varying success of this operation, and especially the successes of those who, having no special knowledge, have operated under circumstances in which they were unable to obtain skilled assistance, the writer concludes that the requisites for success are of the simplest kind; but such as they are, they are essential, and to disregard them is to fail:

1. No case is favorable which is septic at the time the operation is to be performed. In such cases the child can be disregarded, it being already

dead, and we have only to consider the mother. In these cases it is better to avoid Cæsarean section.

2. Absolute cleanliness—to be obtained by whatever means; we most rely upon the simplest that are effectual.

3. We must use a reliable suture for the uterus—one that will not come untied in spite of the rhythmical relaxations and contractions of the uterine wall. It is immaterial whether silk or silver wire is used, both having advantages. The suture should be inserted through the whole thickness of the muscular wall, avoiding the decidua, and at a sufficient distance from the edge of the wound to prevent its cutting out.

Vaginal Hysterectomy in the Pregnant Cancerous Uterus.

McNutt, in an article read before the San Francisco Gynecological Society (*Pacific Medical Journal*, 1893, xxxvi.), reports the case of a woman, aged twenty-nine, of good family history, mother of four children, with three miscarriages. Examination showed the cervix enlarged, with epithelial-like excresence, quite filling the vagina, and bleeding at the slightest touch. Bimanual examination revealed the fact that the body of the uterus was much enlarged and quite movable except at the left vaginal juncture. There was constant hemorrhage, but no regular menstruation for three months. A diagnosis of probable pregnancy, complicated with uterine cancer, was made, and vaginal hysterectomy advised. The uterus was found at the operation to be larger than the bimanual examination indicated; many adhesions were present. The tissues were very vascular, and the hemorrhage more than usual. It was found impossible to ligate or clamp on account of the cervical growth, and after much difficulty he succeeded in bringing the fundus down, but even then was unable to ligate and clamp on account of the size of the uterus, which filled the vagina completely. On this account he was compelled to split the uterus, and the child was delivered. Uterus and appendages were removed. The patient made a good recovery.

When the child has been carried to full term, it has been found that over 50 per cent. of the mothers die undelivered, and of those delivered at the end of gestation about 30 per cent. die within a few days after delivery, making over 80 per cent. of maternal deaths if the child is carried to term. He strongly recommends early vaginal hysterectomy in these cases.

Obstetric Paralysis with reference to its Pathology and Etiology.

Carter, in an interesting article (*Boston Med. and Surg. Journal*, 1893, vol. cxxviii., No. 18), reports fifteen cases of the above affection which have come under his observation in the past two years, and a physical examination has revealed certain conditions common to all, with one exception. The affected arm is held by the side in a position of internal rotation, the elbow pointing outward; the fingers are usually semi-flexed. A careful examination has shown that in every case there has been a paralysis of the deltoid, supra- and infra-spinatus, teres minor, biceps, and brachialis anticus, together with the supinators. In some of the severe cases there has also been paralysis of

some of the extensors of the wrist, or more especially the fingers. In looking for the location of the lesion we at once find that the distribution is very similar to the paralysis of Erb.

Experiments of Ferrier and others, together with anatomical investigations in cases where this type of paralysis has been occasioned by injury to nerves, or by pressure of new growths, have definitely proven that the nerve supply of the muscles most frequently affected by the condition under discussion is derived from the first trunk of the brachial plexus, which is made up by the union of the fifth cervical roots together with the communicating branch from the fourth.

As regards the causes of the above injury, those most commonly assigned are:

Pressure on the neck, from blade of forceps, finger, or hook.

Over-extension of arm.

Pressure in axilla in stretching.

The writer suggests that another cause, of which little or nothing has been said by the various authorities, is the stretching of the uppermost trunk of the plexus, either by traction on the head, by the hands or forceps, by traction on the shoulders in extracting the after-coming head, or by rapid expulsion of the head from contraction of the uterus when a shoulder has met with some obstruction, as, for instance, the brim of the pelvis, thus widely separating the head from the shoulders, and stretch ing the nerve trunks. This is also helped by the flabby condition of the newborn child, with the comparatively inelastic nerve trunks.

It does not seem to be settled that loss of sensation is constant in these cases, or if present, it does not always become permanent.

It is a well-known fact that the paralysis of poliomyelitis rarely, or probably never, entirely disappears, and that if improvement takes place it is usually within the first few months from the onset. With the above-named class of cases the opposite is the rule.

In regard to the prognosis of obstetric paralysis, it is good, but frequently exceedingly slow. Recovery varies from a few months to two or three years. The great majority get well, as is indicated by the fact that none of the physicians connected with the Nervous department of the Masachusetts General Hospital has ever seen the condition, dating from birth, in an adult patient, and the writer has only been able to discover one case where paralysis persisted to adult life.

The treatment consists mainly in the use of passive movements, massage, and electricity. Galvanism over the affected muscle and through the region of the brachial plexus, frequently applied for months, seems to be the most successful means of relief; though Lovett has suggetted the use of the Velpeau bandage to prevent relaxation of the ligaments of the shoulder. The author gives several interesting tables on this form of paralysis, and shows that the injury bears a relation to certain presentations and positions.

Puerperal Neuritis.

Lamy (*Gazette hebd. de Médecine et de Chirurgie*, 1893, No. 15, p. 170) describes a condition of neuritis existing in the puerperal state which

differs in several important characteristics from the ordinary type. This form, which consists principally of pain and paralysis, with muscular atrophy, involves most frequently the lower limbs, and has often been ascribed to pressure on the pelvic nerves by the fœtal head. All cases do not admit of this explanation.

Moebius attributes puerperal paralysis to infection, and shows the analogy to paralyses following erysipelas or typhoid, considering the latter due to parenchymatous and peripheral change. It often develops many days after a simple labor, and amid symptoms indicating puerperal infection. It frequently happens that paralyses of this kind limit themselves to the group of muscles supplied by the external popliteal nerve. The author divides this disease into three groups: Infectious, traumatic, and neuritic by propagation. Of the first, we find one class in which the paralysis and pain extend to all four extremities and trunk; of the second, the want of power is localized, infecting only the upper or lower limb. Of the general neuritis only three cases have yet been reported.

The constitutional symptoms are similar to those of ordinary neuritis, persistent vomiting seeming to be somewhat characteristic. The onset of the paresis is announced by troubles of sensation, formications, pinching of limbs, and increasing muscular debility, particularly attacking the extensors of the hand and foot. The walk is peculiar; a light passing hyper- or hypoæsthesia may be present. The muscular masses, tendons, and nerve trunks are tender on pressure, independently of spontaneous pains. These symptoms amend when the period of actual paresis comes on. Tendon reflexes are abolished, and reactions of degeneration have been witnessed in the atrophied muscles. In one case death took place in three months, in a condition of general infection. The muscles of the trunk and abdomen had been attacked as well as the sphincters. The spinal column had also been affected. The disease is very difficult to diagnosticate from "acute central myelitis." The fact of its appearing after childbirth, or with symptoms of infection, will aid in the diagnosis.

Charcot calls attention to a peculiar amnesia for recent events, combined with an otherwise sound condition of mind.

The most successful treatment has been found in electricity. The disease tends toward recovery in from eighteen months to two years.

Post-mortem Birth.

Moritz (*Vierteljahrsschr. für gerichtl. Med.*, 1893, N. F., Bd. v., Heft 1, S. 93) reports a case in which the body of a woman, dying undelivered during pregnancy, was disinterred several days after burial. The body was found in an advanced stage of decomposition. The fœtus was found in the coffin, and it was supposed that the pressure of gas in the mother's body had forced it from the uterus.

The Porro Operation for Puerperal Eclampsia complicated by Hypertrophic Cervix.

Groom (*Medical Press*, 1893, No. 2812, p. 323) reports a primigravida taken with eclampsia during labor. The genital canal was very narrow and

undilatable; the fœtal head high in the pelvis, and the progress of labor ceased. It was found impossible to dilate the cervix; accordingly the Porro operation was performed, and a healthy male child delivered asphyxiated, but which subsequently recovered. The mother perished in an eclamptic seizure.

Symphysiotomy for Contracted Pelvis.

Coe reports (*Medical Record*, 1893, No. 1172) a case of symphysiotomy in a primipara having a contracted pelvis and deficient in mental development. The true conjugate was barely three inches; the head presented, but could not enter the pelvis. The operation was performed under antiseptic precautions, and the joint severed by a probe-pointed bistoury. The bones did not separate to any extent until the sub-pubic ligament was divided. Version was then performed with difficulty, and the child, weighing eight pounds one and a half ounces, was delivered deeply asphyxiated. Owing to the depth of the wound, the tissues about the symphysis were not sutured, but the bones approximated by pressure and by a strip of adhesive plaster. The patient recovered perfectly from the operation, but developed mania. She died demented two months after the operation, and a careful examination of her pelvis showed that firm union had taken place at the site of the pubic section.

GYNECOLOGY.

UNDER THE CHARGE OF

HENRY C. COE, M.D., M.R.C.S.,
OF NEW YORK.

Papillary Ovarian Cystoma with Secondary Growths on the Intestines.

Theilhaber (*Münchener med. Wochenschrift*, 1893, No. 15) reports a case of cœliotomy for ovarian cyst complicated with secondary growths on the intestines, the patient having ascites and being so cachectic that it seemed fair to infer that the prognosis was most unfavorable. She was in good health a year and a half after the operation, a fact which seemed fully to justify removal of the tumor in such cases, in spite of the various opinions to the contrary. Similar cases have been reported by Burt and Leopold.

Ascites due to Papilloma of the Peritoneum.

Sutton (*Lancet*, April 8, 1893), in a clinical lecture on hydro-peritoneum, calls attention to the fact that operators are often alarmed on opening the abdomen to find a papillomatous cyst with secondary growths on the peritoneum. He thinks that these are comparable to a crop of warts on the skin,

i. e., they may appear and disappear suddenly. The epithelium covering them is easily detached, and the cells float about in the ascitic fluid and sink to the bottom of the pelvis, to become attached to the peritoneum and form the nuclei of new growths. "Remove the tumor, the supply of germ-epithelium ceases, the warts die, and the crop is not replenished." From the large number of cells found in the peritoneal fluid in these cases the presence of cancer might be inferred, but experience has shown that the microscope is an uncertain aid to diagnosis in this respect.

Neoplasms of the Uterus of Decidual Origin.

Sänger (*Archiv für Gynäkologie*, Band xliv., Heft 1) contributes an elaborate article on this subject, to which he has previously furnished a valuable contribution (*Centralblatt für Gynäkologie*, 1889). He describes and reviews the history not only of so-called *sarcoma uteri deciduo-cellulare*, which he had before described, but of all the other forms of decidual neoplasms, which he classifies as follows:

1. Inflammatory conditions, such as decidual endometritis, either hyperplastic, cystic, or polypoid, with a sub-variety of syphilitic origin. 2. Decidual polypi, including several different varieties. 8. True neoplasms, of which there are to be differentiated adenoma, "benignant" and "malignant" deciduoma (which he calls "deciduo-sarcoma"), and the *sarcoma chorion—deciduo-cellulare* of Gottschalk and Kaltenbach.

Treatment of Pelvic Suppuration.

Terrier and Hartmann (*Le Mercredi Médical*, 1893, No. 15) summarize the results of their observations in fifty-nine cases as follows: Cœliotomy is preferable to vaginal hysterectomy in the treatment of such cases, because it is often possible to save one tube and ovary—a fact which, together with the lessened risk, outweighs the mere object of avoiding an abdominal cicatrix. The latter operation, however, should not be entirely rejected, since it is applicable to rare cases of bilateral suppuration in the peri-uterine cellular tissue, as well as to those of multiple purulent foci within the pelvis. The writers resorted to it in only four cases, two of the patients being cured.

Fixation of the Uterus to the Periosteum of the Symphysis Pubis.

Kuemmel (*Deutsche med. Wochenschrift*, 1892, No. 49) reports six cases in which he practised a new method of fixation of the retroflexed uterus. After replacing the organ, three sutures were passed through the fundus and the periosteum on the posterior surface of the symphysis. A median suture was inserted deep into the muscular tissue of the fundus and beneath the periosteum, with two more superficial lateral sutures to support it. Caution is necessary in order not to break the needle against the bone. The writer believes that this method secures firmer and more permanent fixation than any other. Of the six cases, three were of retroflexion and three of prolapsus, one patient in the first class being normally delivered eighteen months after the operation, the uterus remaining in the same position six months later. In

the other five the uterus was found to be firmly adherent to the symphysis from one to two years after the operation.

[On theoretical grounds, it would seem as if fixation of the uterus to the symphysis would interfere materially with the functions of the bladder, as seen in cases of pathological adhesion.—H. C. C.]

The Etiology of Primary Tuberculosis of the Genital Tract.

Frankenburger (*Münchener med. Wochenschrift*, 1893, No. 17) discusses the possibility of infection through coitus, which he regards as probable, though not positively demonstrated by the presence of tubercle-bacilli in the semen of the male. Most writers affirm that when both the uterus and tubes are affected, the latter are the primary seat of infection. On the other hand, he affirms, tuberculous infection may long remain latent in the tube without producing any pathological appearances.

Total Extirpation of the Fibroid Uterus.

Péan (*Annales de Gynécologie*, 1892, No. 7) has modified his original operation, in which, after clamping the upper portion of the broad ligaments, he excised the tumor, then secured the uterine arteries with clamps and removed the stump *per vaginam*. Now, he applies a rubber cord temporarily, removes the uterus, then dissects off the bladder and rectum, and adjusts an écraseur below the cord. The ends of the wire are carried down into the vagina, and it is left to come away with the stump.

The Histogenesis of Epithelial Tumors of the Ovary.

Stratz (*Zeitschrift für Geburts. u. Gyn.*, Band xxvi., Heft 1) concludes that adenomata may develop from either the external or follicular epithelium through the inclusion of cell-ingrowths. The origin of the cystic or papillary form depends upon the relative share which the parenchyma or stroma takes in this process. It is probable that dermoids also develop from adenomata.

Experimental Contribution to Abdominal Surgery.

Thomson (*ibid.*), from experiments on dogs, arrives at the following conclusions with regard to lesions of the intestines and ureters:

1. Intestinal sutures. The Czerny-Wölfler suture best fulfils all the indications in enterorrhaphy, other methods being uncertain and dangerous.

2. In lesions of the gut a careful distinction should be made between cases as to whether the tissue is normal or diseased. Simple defects of the serous covering, not over half an inch square, may be disregarded; larger raw surfaces may be covered with healthy mesentery, or attached to the parietal peritoneum in such a way that no bend or twist will be caused. Small wounds involving the muscular layer may heal after suturing, but it is often better to cover them as before mentioned; if larger, resection is necessary. Deeper lesions, especially in a diseased intestine, require resection; if this is not possible, they should be thoroughly disinfected and covered with mesentery, with gauze drainage. Free peristalsis does not prevent adhesions.

3. Injury to the ureters. It is not advisable to attempt to suture a divided ureter in continuity, even over a catheter, as there is great danger of stenosis. Neither is it proper to suture the proximal end into the bladder or intestine; nephrectomy offers the only certain chance of cure.

Median Section of the Uterus in Vaginal Hysterectomy.

Quenn (*Centralblatt für Chirurgie*, 1892, No. 42) recommends the following method of extirpating the uterus *per vaginam* in cases of pelvic suppuration: After separating the cervix the broad ligaments are secured with clamps. Then the uterus is divided in the median line up to the fundus. The endometrium is thoroughly cauterized with a 10 per cent. solution of chloride of zinc. The cut is next extended through the fundus, each half of the organ is seized in turn with a volsella and is twisted out and excised. The peritoneum is sutured to the edge of the vaginal wound according to Martin's method. This plan is regarded by the writer as a marked improvement over Péan's method of *morcellement*.

Ichthyol in the Treatment of Gonorrhœa.

Jadassohn (*Deutsche med. Wochenschrift*, 1892, Nos. 38 u. 39) reports thirty-seven cases of gonorrhœa in the female treated by injections of solution of ichthyol (from one to ten per cent.). He has found the drug most valuable in cases of specific urethritis and cervical endometritis. It is applied either on an applicator or on strips of gauze, which are left *in situ* for an hour. A ten per cent. solution in glycerin is used in the cervical canal. In the early stage of acute gonorrhœa he thinks that ichthyol is even better than nitrate of silver.

Conservative Operations upon the Ovaries.

Pozzi (*Ann. de Gyn. et d'Obstétrique*, March, 1893) reports twelve cases in which he practised resection and ignipuncture of diseased ovaries with satisfactory results. He reviews the history of the operation, especially the work of Schroeder and Martin, and lays down the general rule that whenever the tube is healthy and the corresponding ovary alone is diseased, the latter should not be entirely sacrificed unless it appears to be absolutely necessary. The most favorable cases for resection are those in which a portion of the ovary remains quite healthy, especially where there is a single follicular cyst. The technique consists in first establishing the fact that the tube is patent by introducing a fine probe throughout its entire length. Then the surgeon fixes the ovary between his thumb and finger, and removes a wedge-shaped mass containing the diseased portion; the raw surfaces are then united with catgut, which serves to control the hemorrhage, deeper sutures being passed if necessary. Slight compression is sufficient to arrest oozing from the needle-punctures.

In many cases the surface of the ovary is covered with small cysts, the only healthy portion of the stroma being confined to the hilus; under these circumstances almost the entire gland can be excised.

In his later operations the writer says that he has also performed "sal-

pingorrhaphy," or suture of the fimbriated extremity of the tube to the remains of the ovary, in order that the ovum, when discharged, may have no difficulty in entering the duct. This procedure is especially applicable to cases in which it has been necessary to separate adhesions around the tube, which would tend to promptly reform.

He has of late frequently substituted ignipuncture with the thermo-cautery for resection, where the surface of the ovary was studded with small cysts. If there seems to be general cystic degeneration, the point may be bored into the depths of the stroma. It has been objected that the result of this treatment would be to cause the formation of cicatricial nodules within the stroma, which would not only prevent the normal development of the Graafian follicles, but would favor the formation of new cysts. To this the writer replies, that since the cauterization is aseptic, the eschar is absorbed without the presence of an inflammatory process, the conditions being essentially different within the peritoneal cavity from those present on the exterior of the body. On the contrary, the clinical results of his operations have convinced him that the "substitutive irritation" produced by the cautery actually favors the absorption of cirrhotic tissue. Ignipuncture of a follicular cyst is not to be compared with cauterization of a cystic cervix.

In commenting on his cases, the writer calls attention to the fact that in only one did he fail to relieve or to cure the painful symptoms due to the ovarian disease—a result as good as could be obtained by castration. Menstruation recurred regularly after the operation, and was more profuse than before, even in patients who had previously had an irregular and scanty flow.

[Professor Pozzi has probably not had his attention called to the pioneer work of Dr. W. M. Polk, of New York, whose papers on this subject have attracted attention here and abroad.—H. C. C.]

PÆDIATRICS.

UNDER THE CHARGE OF

LOUIS STARR, M.D.,

OF PHILADELPHIA;

ASSISTED BY

THOMPSON S. WESTCOTT, M.D.,

OF PHILADELPHIA.

TREATMENT OF VESICAL CALCULUS IN BOYS.

POUSSON, in reporting (*Gazette hebd. des Sciences Méd. de Bordeaux*, No. 24, p. 308) a case of cystotomy for stone in a boy of eleven years, makes the following conclusions from a study of the literature:

1. The opinion of surgeons of different countries upon the comparative value of the supra-pubic operation and lithotrity in children is not yet fixed. In France the preference is on the side of the cutting operation, and the statistics of lithotrity, though very favorable, are perhaps misleading from the diversity of their sources.

2. The dimensions of the urethra of the child, which are still uncertainly determined, are the most serious obstacle to the generalization of lithotrity at this age.

3. The supra-pubic operation is almost demanded in children because of the situation of the bladder and the dangers of wounding the ejaculatory ducts, to which almost all the perineal operations expose.

4. Ballooning the rectum, far from being indispensable, is sometimes troublesome and even dangerous; a simple sponge in the bowel suffices to maintain the bladder in position.

5. Union of the bladder by first intention, after suture of the wound, is possible in children. In this case the retained catheter is at least prudent, if not absolutely indispensable.

The Value of Indicanuria as a Sign of Tuberculosis.

In 1890 Hochsinger, of Vienna, advanced the proposition that the presence of a notable amount of indican in the urine of children from one to six years of age was a conclusive sign of the existence of tuberculosis. In 1892 Kahane published a detailed study of the subject, in which he quoted the cases studied by Hochsinger and made it evident that in many instances but a single examination of the urine for indican had been made. He, however, reached conclusions corroborating those of Hochsinger. Up to the present time no further papers on the subject have appeared, excepting the more exhaustive study of the younger Steffen. This author grouped together 18 cases of known tubercular disease, dividing them into two classes as the children were under or over six years of age. In the first group, of 9 cases, there were made 654 examinations of the urine, with the result that no indican was found 372 times; a trace, 120 times; a little, 94 times; a moderate quantity, 42 times; considerable, 25 times; and once a very large quantity. In the second group of cases, with 533 examinations, no indican was found in 334 instances. These results obtained in cases of positive tubercular disease are diametrically opposed to the conclusions of Hochsinger and Kahane.

Voute, of Amsterdam, has now published a new study of the subject (*Revue mens. des Maladies de l'Enfance*, 1893, p. 49). His method of examination is that of Jaffé, as modified by Stokvis of Amsterdam. In the majority of examinations he precipitated the urine by a certain quantity of a ten per cent. solution of acetate of lead, which renders the separation of the chloroform easier and prevents the formation of an emulsion with the rest of the liquid.

Two series of cases were studied; the first, embracing cases where latent tuberculosis could be presumed, cases of more or less advanced tuberculosis, and so-called scrofulous cases—a total of thirty-seven; the second series including cases of digestive derangements, or of diseases in which digestion was not disturbed. The second series thus controlled the first, for if tuberculosis be generally accompanied by an increased production of indican, the relative amounts should be greater in the first than in the second series of cases. The result of these analyses was comparable to Steffen's observations. In 39 examinations of the first series, for cases under six years of age, no indican was found 10 times, and a very strong reaction in 11; while in 32

examinations in the second series, under like conditions, no indican was found in 7 instances, and a very strong reaction in 11. Thus, instead of finding larger quantities of indican in the first, or tuberculous series, the result was rather inferior to that obtained in non-tuberculous cases.

It is well known that a trace of indican appears in the urine of healthy adults and most children over one year of age; and that this proportion may be greatly augmented by disease or disturbed function of the small intestine. Thus Jaffé found enormous quantities of indican in cases of intestinal occlusion. Hochsinger and Kahane believed that an explanation of their theory could be found in the alterations in the digestive apparatus consequent upon the general atrophy of the organism produced by tuberculosis; but from the results just detailed it seems necessary that experiments on a much more extensive scale must be instituted before any definite importance should be attached to Hochsinger's sign.

The Bacillus of Löffler in the Pharynx after Diphtheria.

Tobiesen (*Centralblatt f. Bakteriologie*, 1892, p. 587) publishes a study upon this interesting point. He states that the bacillus has been found in the throat after the fall of the membrane as long as six weeks by Roux and Yersin and by Ritter. He himself has frequently found it on the fourth, fifth, and sixth day, and, in one case, on the tenth, twenty-second, and thirty-first day after the fall of the membrane. The frequency of the bacillus under these conditions has no connection with the gravity of the case. Concerning the influence of complications in favoring the continued existence of the bacillus, croup seems doubtful, but diphtheritic coryza certainly does favor it. Among 19 guinea-pig inoculations with the bacillus thus derived, 16 animals died within twenty-four to fifty hours, and the 3 remaining ones had either necrosis or paralysis. The natural conclusion of this study is that diphtheria patients, after leaving the hospital, are very liable to communicate the disease to others. As a matter of fact, upon following up such patients returning home carrying the bacillus in the secretions of the mouth, Tobiesen has been able to find but one case of the disease, and that one doubtfully, to be referred to such a source of contagion.

Note to Contributors.—All contributions intended for insertion in the Original Department of this Journal are only received *with the distinct understanding that they are contributed exclusively to this Journal.*

Contributions from the Continent of Europe and written in the French, German or Italian language, if on examination they are found desirable for this Journal, will be translated at its expense.

Liberal compensation is made for articles used. A limited number of reprints in pamphlet form, if desired, will be furnished to authors in lieu of compensation, *provided the request for them be written on the manuscript.*

All communications should be addressed to

Dr. Edward P. Davis, 250 South 21st Street, Philadelphia, U. S. A.

Or

Dr. Hector Mackenzie, 77 Lambeth Palace Road, S. E., London, Eng.